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TO CALLERS AND TELEPHONERS

Until further notice our office hours are:—
Mondays to Fridays - 9.30 a.m. till 5.0 p.m.
The office will be closed on Saturdays

An Outstanding Tribute to Lord Stamp

WHAT is probably a unique tribute has been paid by the United States Congress to the late Lord Stamp in the *Congressional Record*, which is the American equivalent of the British *Hansard*. The report of the proceedings contains a eulogy of Lord Stamp's life and work by a Senator Mr. Warren B. Austin, which was unanimously received by the members. Mr. Austin stressed the repercussions in America of the death by enemy action of Lord Stamp, and said that the reverberation of the bomb which killed him had been felt in the homes of many Americans who personally knew Lord and Lady Stamp and their son. He also referred to the outstanding services which Lord Stamp had rendered, not only to Britain but also to the people of the United States of America. There is also reproduced in the *Congressional Record* a letter to Mr. Austin from Mr. Daniel Willard, President of the Baltimore & Ohio Railroad, who had known Lord Stamp for upward of 30 years, and who declared that he was in himself the best product of the English economic system. An editorial article on Lord Stamp from the *Christian Science Monitor* was included in the *Record* by the unanimous consent of the members. This also declared that the dropping of bombs on Lord Stamp's house was felt in many American homes. "He was a master statistician with a flare for quiet whimsy; a mind crowded with the cold considerations of economics, but full of warm kindliness; a character trained in the subtleties of domestic and international politics, but finding its natural expression in straightforwardness"—this, declared the *Monitor*, was Lord Stamp.

* * * *

Vital Importance of Punctuality

A remarkable improvement in the punctuality of trains, particularly on the L.M.S.R., has occurred during the past few months. This important result has, without doubt, been achieved largely because of the raising of the maximum speed limit above the 60 m.p.h. hitherto laid down as a wartime measure, and the abolition during periods of "alert" of any restriction of speed in the daytime and its raising from 15 to 30 m.p.h. for passenger trains during hours of darkness. In addition, the L.M.S.R. has issued an official instruction to drivers that when passenger trains are running late they must endeavour to make up time, provided, of course, that all speed restrictions are strictly observed, and that the maximum of 75 m.p.h. now permitted is not exceeded. So far as we know, this is the first time a British railway has issued such a specific instruction, although for many years similar instructions have been standard practice on the Continent. If punctuality is important in peacetime, it is almost vital in time of war, for every delay is liable to have its repercussion, and under present conditions transport delays may have very serious results in causing congestion at strategic points.

* * * *

Brazilian Railway Supervision

It is reported that the Brazilian Government has created a National Railway Department in the Ministry of Transport & Public Works, and that the former Federal Railway Office (Inspectoria Federal das Estradas) has been abolished. The function of the new department will be to supervise all phases of the general railway programme of Brazil, and by the middle of October next the department will also carry out the supervision of railways operating under State concessions. It will be expected to study and suggest measures by which the railway programme may be put into effect, and also to establish general rules covering all railway activities. The supervision and administration of the railways belonging to or leased by the Federal Government, and advice on the granting of administrative and financial autonomy to railways in charge of the Federal Government, will also fall within its ambit. Another aspect of the work of the department will be that of determining policy as to the leasing of railways to private companies. Certain other matters which will be dealt with by the department are the direction and organisation of accounting and statistical matters; the compilation of data on the consumption of railway materials; measures to avoid competition between railways which might

adversely affect their financial condition; and the putting forward of regulations to prevent rate wars.

* * * *

Pullman Incorporated

The annual report of Pullman Incorporated and its subsidiaries for the year 1940 shows a consolidated net income of $7,484,125, which exceeded 1939 earnings by $3,474,650 and covered by a substantial margin the year's total dividend disbursement of $1.50 a share. This net income, after providing $2,443,313 for federal income tax, was made up of $2,971,306 (against $2,630,298) from sleeping and parlour car business; of a net manufacturing profit of $6,517,353, compared with $418,348; and $438,779, compared with $1,684,098, from investments. The manufacturing profit was far the best since that of $9,059,115 in 1937, the last previous year of good production volume in the car-building business, and with that exception was the largest profit for any year in the last decade. Production of armament for national defence and for British Government account did not enter into 1940 results, but large orders for such equipment have been booked for 1941 and subsequent delivery. Maintenance of first class rail fares at the present level over coach rates has contributed to some diversion of first class rail-Pullman passenger business to airways, ordinary railway coaches, and highway vehicles. In order to lessen the effect of such diversion the company has introduced a new type of large-capacity car of combined coach-and-sleeper characteristics, designed to provide sleeping accommodation in a real bed at low fares.

* * * *

Overseas Railway Traffics

The continuance of floods in the territories served by the Argentine North Eastern and Entre Rios Railways has set back the traffics of these railways for the 45th and 46th weeks of the financial year by 223,200 pesos in the first case and by 112,300 pesos in the second. Otherwise the recent improvement has been maintained, with gains for the two weeks of 1,077,000 pesos on the Buenos Ayres Great Southern, of 787,000 pesos on the Central Argentine, of 449,000 pesos on the Buenos Ayres Western, and of 418,000 pesos on the Buenos Ayres & Pacific. The Central Uruguay records an advance to date of £57,476 in sterling and has reduced its currency decrease to $5,009. On the Leopoldina the increase for the 20 weeks of the current year amounts to £36,108.

	No. of Week	Weekly Traffics	Inc. or Decrease	Aggregate Traffic	Inc. or Decrease
Buenos Ayres & Pacific* ...	46th	1,545	+ 215	65,880	+ 1,489
Buenos Ayres Great Southern*	46th	2,304	+ 409	102,516	– 6,373
Buenos Ayres Western* ...	46th	900	+ 223	35,993	– 508
Central Argentine*	46th	2,141	+ 355	75,032	– 6,504
		£	£	£	£
Canadian Pacific	19th	826,400	+ 193,400	13,235,000	+ 3,070,800
Bombay, Baroda & Central India	6th	297,000	– 27,750	1,273,200	+ 53,100

* Traffic returns in thousands of pesos.

Up to May 17 the aggregate traffics of the United Railways of Havana for the 46 weeks of the current financial year amounted to £1,120,110, a decrease of £20,535. In the 46th week there was an increase of £6,159.

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Bulgarian State Railways in 1940

The expansion in Bulgarian railway traffic, evident since 1935, continued at an accelerated pace during 1940. Comparative figures for recent years are as follow:—

Traffic	1938	1939	1940*
Passengers	9,883,600	10,812,200	12,500,000
Carloads	379,200	393,300	440,000
Merchandise ... metric tons	5,518,800	5,743,600	6,400,000
Receipts	Millions of leva	Millions of leva	Millions of leva
Passengers	467·5	479·6	580·0
Merchandise	1,002·1	1,060·7	1,200·0
Various	43·0	85·9	95·0

* Estimated

The rise in freight carried was due principally to the increasing amount of foreign trade. On the other hand, passenger traffic was augmented largely because of travel facilities and special excursion rates offered to Bulgarian tourists. The renting of freight cars from other countries during the autumn export season for fruits and vegetables was on a much smaller scale than in previous years. The resultant shortage, however, was offset partly by the importation of new rolling stock and the repair of old equipment, and partly by the requisitioning of cars from domestic traffic.

Swiss Private Railways in 1940

As might be expected, the peculiar situation of Switzerland at the present time has reacted unequally upon the private railways according to whether they are concerned primarily with business traffic or with the foreign tourist trade. The "business" railways benefitted like the Swiss Federal Railways by the shifting of freight off the highways to the rail during 1940 as the result of the severe rationing of petrol and the resultant withdrawal of approximately one-half of the motor vehicles in Switzerland. Accordingly, some of the private railway companies reported increased receipts. On the other hand, with the notable exception of the Arth—Rigi and the Stansstad—Engelberg lines, the business of mountain railways, which depends largely on the foreign tourist trade, suffered a heavy decline. The Pilatus Railway was most severely affected, its receipts having dropped by almost 42 per cent. after a decline of 40 per cent. in the preceding year. In 1940, the receipts of this railway amounted to barely one-sixth of the figure for 1928. Receipts of the Brunnen Morschach Railway, which dropped 24 per cent., amounted to only one-fifth of the figure in 1928. With a decline of 15 per cent., receipts of the Vitznau-Rigi Railway were only one-fourth of the level in the boom year 1929.

* * * *

Reducing Air Mail Terminal Delays

Aircraft services over land routes, unless the length of journey is considerable, lose much of their speed advantage over other means of transport by reason of the time expended in terminal journeys between airport and town centre. For the expeditious handling of air mail, experiments have recently been conducted in the U.S.A. on the lines of the mail bag exchange apparatus used by travelling post offices on the railway. These "pick up" air mail services, operated by All American Aviation, are now stated to have proved so successful that the company is seeking to extend the system to seven more routes, serving 250 cities and towns. Aircraft on the "pick up" service lower a cable, to which the mailbag for delivery is attached, and release the bag at the required spot. Mail for collection is suspended between two vertical posts on the aerodrome, and is picked up by a hook suspended from the aircraft. It is understood that the facilities are also available for light freight, a step which has never yet been taken on railways.

* * * *

Controlled Cooling of Rails

So important is the controlled cooling of rails now considered to be in the United States, in the interests of safety, that steps are being taken by the Rail Committee of the American Railway Engineering Association to draw up a standard specification for the application of the treatment. As regards temperature, it is proposed that the rails shall be charged into the cooling boxes at not more than 1,000° nor less than 725° F., and that no rails shall be removed until the temperature of the top layer of rails has fallen to 300° F. or less. Further, the container must be insulated sufficiently to ensure that the rails will take a minimum of 7 hr. to cool through the range of temperature indicated; and it is proposed that the manufacturer shall be required to leave the rails in the container, with the lids in position, for at least 10 hr. Temperatures in the cooling boxes will be measured by reliable pyrometric equipment applied to an outside rail not less than 12 in. nor more than 36 in. from the end; before charging the rails their temperature is to be determined by a pyrometer applied not less than 12 in. from the rail-end. Although the specification is at present tentative, it is understood that all controlled-cooled rails purchased this year by railways which are members of the A.R.E.A. will be treated in accordance with its provisions.

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Steels of High Creep Strength

During the last few years the operating temperature of many industrial processes has increased enormously and in many instances has reached a point where ordinary steels can be no longer used. The reason for this is that, at temperatures of above about 350° C., steel behaves in a viscous

rather than elastic manner and yields continuously to applied stresses. The elastic limit, yield point and maximum stress are no longer well defined properties, but depend on the applied stress and the rate of loading, and they cannot, in fact, be used for purposes of design where sustained loads have to be borne. Under such conditions, therefore, calculations must be based on the continuous deformation produced by a sustained load over a long period, which is known as "creep," this being defined as the stress which will produce a certain rate of deformation, or creep, at a certain temperature. The period of test to which the figures refer should be stated. It has been found that certain elements, notably molybdenum, greatly increase the creep strength of steel up to a maximum temperature of 550° C., and the steels dealt with in this catalogue have been designed to work within this temperature range. All are characterised by high creep strength and are immune from or exhibit no practical tendency to embrittlement after prolonged heating at high temperatures, but they differ with respect to their properties at ordinary temperatures.

* * * *

Pneumatic Signalling Replaced in Chicago

Electro-pneumatic signal boxes of modern design have lately replaced the two low-pressure pneumatic boxes, installed 41 years ago on the Chicago & Western Indiana Railroad at 15th and 16th Streets, Chicago. They were probably among the last installations left in America of the all-pneumatic type, once considered to possess great advantages. One form, using high pressure, was produced by J. W. Thomas and installed in 1897 at Nashville, on the Nashville, Chattanooga & St. Louis, but, we believe, nowhere else. Of the low-pressure form, due to F. L. Dodgson, there were many important installations, first in America and then also in England, where several valuable improvements in design were introduced. The first installation in Great Britain at Grateley, L.S.W.R., opened in 1901, the apparatus for which was brought from America, has disappeared, and others have also been removed or converted to electro-pneumatic working. Originally a purely mechanical mechanism (one of the chief claims then advanced for it), track-circuit and other electrical controls were successfully added to meet more stringent safety requirements. The low-pressure apparatus was also installed in Argentina, round Düsseldorf in Germany, and, with route-setting facilities, at Ermont on the Northern Railway of France. The largest terminus fitted with it was the old Grand Central Terminal in New York, but Retiro, Buenos Aires, had a bigger yard.

* * * *

Big Australian Locomotives

Besides the new "H" class 4-8-4 locomotives of the Victorian Government Railways described in our issue of May 9 (page 522), there are two other large Australian locomotives with which it is interesting to compare the new engine. These are the South Australian "500B" class, of the 4-8-4 type, and the New South Wales "D57" class, of the 4-8-2 type. The former exerts a nominal tractive effort of 51,000 lb., supplemented when the booster is in operation by another 8,000 lb. The nominal tractive effort of the New South Wales engine is 56,000 lb., and these figures compare with the 55,000 lb. of the new Victorian locomotive. The last-named has a boiler pressure of 220 lb., as compared with the 200 lb. of the other two. All three engines have a 28-in. cylinder stroke, and the Victorian and New South Wales locomotives each have three cylinders, the former of 21½ in. dia., and the latter of 23¼ in. dia., whereas the South Australian engine has two 26-in dia. cylinders. The driving wheel diameters are, respectively, 5 ft. 7 in., 5 ft. 3 in., and 5 ft. in the Victorian, South Australian, and New South Wales locomotives. The respective grate areas are 68, 66, and 65 sq. ft., and the combined total heating surfaces are 4,780, 4,444, and 4,163 sq. ft. respectively. The engine weights are 146, 144, and 139 tons, and the total engine and tender weights, 260, 233, and 228 tons, respectively. The new Victorian locomotive, being the most modern, incorporates certain developments, such as thermic syphons and arch tubes in the firebox, and double blast arrangements, which should contribute to high efficiency.

The Railways of the U.S.A.

THE 54th annual report of the Interstate Commerce Commission, dated Washington, November 1, 1940, embodies in a concise volume all the principal features, including operating statistics, of the railways of the U.S.A. for the year 1939, with some additional comparative figures for the first eight months of 1940. In the previous report (see THE RAILWAY GAZETTE of March 8, 1940, page 336) the commission reviewed the transport legislation then pending in Congress, and the present report describes the events leading up to the passing of the Transportation Act, 1940, which received the President's signature on September 18. The Act begins with a declaration of policy to govern the administration and enforcement of all provisions of the Interstate Commerce Act. Then there are three parts: Title I, containing amendments to the existing law; Title II, providing for the regulation of waterway carriers; and Title III, which includes miscellaneous provisions. The most important of the amendments in Title I is a revision of Section 5 governing pooling of traffic, service, or earnings, and the unification of carriers. It is important in that it repeals the provisions which directed the commission to prepare and adopt a plan for the consolidation of railroads into a limited number of systems. Other amendments direct the activities of the commission and enlarge its powers, especially as regards rate making, superseding in this respect the provisions of the Hoch-Smith resolution. Title II brings waterway carriers under the authority of the commission. Part I of Title III provides for the establishment of a board of investigation and research, to be composed of three members appointed by the President. All classes of carriers reporting to the commission experienced a substantial improvement in their gross revenues in 1939, and the improvement continued in 1940. The aggregate revenues for 1939 amounted to $5,734,318,000, or 12½ per cent. more than in 1938, while the estimated total for the 12 months ended June 30, 1940, showed a further rise. For all Class I steam railways, excluding switching and terminal companies, the principal statistical operating figures are compared in the following table:—

	1938	1939
Route miles open	236,842	235,064
Passenger and freight train-miles	816,198,894	843,248,857
Passengers carried	452,731,000	450,373,000
Passenger-miles (thousands)	21,628,718	22,651,334
Freight, revenue tons	1,399,259,000	1,636,215,000
Freight, revenue ton-miles (thousands)	290,084,371	333,438,412
Operating ratio, per cent.	76·35	73·05
	$	$
Passenger revenue	405,424,288	416,916,864
Freight revenue	2,857,899,307	3,251,096,141
Total operating revenue	3,564,829,551	3,995,070,943
Operating expenses	2,721,494,485	2,918,215,991
Tax accruals	340,694,548	355,766,155
Equipment and joint line rents	129,489,879	132,287,904
Net railway operating income	373,150,639	588,900,893

To the net railway operating revenue "other income" is added, amounting in 1939 to $160,811,667, and interest, rents, and other charges, aggregating $654,959,889, are deducted, leaving a net surplus of $94,638,951, as compared with the deficit of $121,348,707 in 1938. In 1937 there was a surplus of $98,671,034. Total railway capital outstanding was $21,193,501,000, of which $11,419,945,000 represented funded debt unmatured, and $9,773,556,000 represented stock. The ratio of debt to capital was thus 53·9 per cent. The report also shows that the ratio of net income to stock has fallen from 9·92 per cent. in 1929, and 5·77 per cent. in 1930, to 1·44 per cent. in 1939. On July 1, 1940, the 107 steam railways in receivership or trusteeship accounted for 76,989 miles of road operated, or 31·04 per cent. of the entire railway mileage. During the year ended October 31, 1940, 115 applications were filed for permission to abandon 1,781 miles of road; actually 124 applications were granted, involving 1,051 miles of Class 1 carriers and 869 miles of short lines. The present open mileage, 235,064, is less by 14,369 miles than that of 1929. The unfavourable financial condition of the railways as a whole in recent years has attracted widespread attention, but, according to the report, the motor carriers, which are strong competitors of the rail-

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ways, also have not been especially prosperous as a class, There is recorded a continued reduction in the number of locomotives, the total of 45,172 in service at the end of 1939 (including switching and terminal companies), comparing with 46,544 in 1938 and 61,257 in 1929. But the average tractive effort (on Class I steam railways) has risen from 44,801 pounds in 1929, to 50,395 in 1939. During the same period the number of freight cars fell from 2,323,683 in 1929 to 1,680,519 in 1939 (the average capacity increasing from 46·3 to 49·7 tons) and the number of passenger cars from 53,838 to 38,977, excluding privately-owned and Pullman cars. In 1939 privately-owned freight-carrying cars numbered 281,186 and cars owned by the Pullman Company 7,052. The average number of employees, which in 1929 was 1,660,850, had fallen in 1939 to 987,675, but the total wage bill, which in the earlier year had represented 46·13 per cent. of the revenue and 64·28 per cent. of the expenditure, still accounted in 1939 for 46·64 and 63·85 per cent. respectively. In the first half of 1940 the number of employees and the amount of salaries and wages both show an appreciable increase.

The extraordinary measures now being taken by the Government of the U.S.A. for national defence had already, in 1940, begun to test the transport facilities of the country. This is evident in the statistics for the early part of 1940, operating revenues for the seven months ended July 31, 1940, amounting to $2,361,674,000, as compared with $2,136,562,000 for the same period of 1939. While there has been some debate as to whether the railways are taking adequate steps to expand their supply of cars and locomotives, it is also true that modern improved methods of working enable more work to be effected per unit of equipment, and the Advisory Commission and the companies realise the importance of the efforts required. In this connection it may be noted that some further financial and statistical results for the U.S.A. railways for the year 1940 were given in THE RAILWAY GAZETTE for March 21, at page 314.

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San Paulo (Brazilian) Railway Co. Ltd.

TRAFFIC receipts on the Santos—Jundiahy main line of 86½ miles (5 ft. 3 in. gauge) showed in the year 1940 an increase in currency of 438 contos., or 0·30 per cent., in comparison with 1939. In sterling they amounted to £1,883,282, an increase of £208,360, or 12·44 per cent. Working expenses on the main line advanced from £1,211,573 to £1,411,662 and were 74·96 per cent. of the gross receipts, as compared with 72·34 per cent. in 1939. On the Bragantina section of 67 miles (metre gauge) there was a loss on working in 1940 of £9,119, against £9,222 in 1939. An improvement from 2·80542d. to 3·14480d. was shown in the average rate of exchange at which remittances were made in 1940. The operating ratio in currency for the whole system was 75·81 per cent. in 1940, against 73·28 per cent. in 1939. Passenger receipts, amounting to £374,981, increased by £63,274, towards which increase first class contributed £26,151. First class receipts (£161,005) represented 42·94 per cent. of the total earnings from passengers in 1940 compared with 43·26 per cent. in 1939. In general merchandise, coal, etc. there was a decrease of 390,994 tons, and the amount of exported coffee fell from 618,298 tons to 387,123 tons, but goods receipts rose from £1,259,080 to £1,378,986. The general financial position is indicated in the accompanying table:—

	1939 £	1940 £
Gross receipts	1,699,710	1,912,164
Expenditure	1,352,275	1,565,408
Net receipts	347,435	346,756
Other income	238,094	56,830
Total income	585,529	403,586
Debenture interest and other payments	434,767	297,998
Dividends	125,000	110,000
Brought forward	86,445	112,207
Carried forward	112,207	107,795

"Other income" in 1940 includes £30,794 transfer from bridge renewal fund. Among "other payments" are £63,825 to the associated road company under agreement, £98,727 transfer to rolling stock replacement reserve, and £10,000 to income tax and N.D.C. The ordinary dividend of 2 per cent., tax free, recommended for 1940 compares with 2½ per cent., tax free, for 1939. It is pointed out by the directors that owing to the accumulation of funds in Brazil due to the paucity of remittances in respect of profits, the payment of any ordinary dividend must depend upon the receipt of sterling.

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The Trans-Saharan Railway

THE importance and urgency attached to the construction of the Trans-Saharan Railway is obvious from the fact that Marshal Pétain has lent his name to a report on the subject, in which occur the statements that "only a railway linking the Mediterranean with the Niger can provide effective communication" and "no other means of transport would suffice to fulfil this object." That both the Vichy Ministers of Transport and for the Colonies should be flying to the scene of the beginning of the construction works also confirms this attitude of the Vichy Government to the project. As the cost of this great work is placed at "five milliard of francs," it would appear that the Nazis also are pressing for the early completion of the railway, seeing that France is being "bled white" by them. They, no doubt, want land communications with Dakar—which will be the Atlantic terminus of the line—as soon as possible, to assist in their threat to the "Straits of Dakar," the narrowest part of the South Atlantic and separating Senegal from Brazil. At present the railhead in Morocco is at Bou Arfa, the terminus of the Eastern Moroccan standard-gauge line, which takes off the Algiers—Rabat railway at Oujda, not far from Oran; but as recorded in our issue of July 12 last, an extension from Bou Arfa to Kenadsa—the terminus of the narrow-gauge Algerian line from Perregaux (also on the main line from Algiers)—was then arranged for and is probably now in hand if not completed.

From Kenadsa, which is near Colomb Bechar in the south-west of Algeria bordering the Sahara, the line will strike southwards across the desert to the Niger river probably at Tossaye, a distance of a little over 1,000 miles. From Tossaye one line will run up the Niger through Timbuctoo to Koulikoro, and another will eventually proceed south-eastwards through Gao and Niamey to French Equatorial Africa. The distance from Tossaye to Koulikoro is about 700 miles, and as the railhead of the Senegal line from Dakar is near Koulikoro, there are about 1,700 or more miles of line still to be constructed to connect the French Mediterranean ports with Dakar, the first 1,000 being through continuous desert. Various methods of working this section have been suggested, but the use of diesel railcars and locomotives seems to be the most likely.

The final 700 miles of line already in existence from Koulikoro to Dakar is of metre gauge and was built in two sections. The first section, opened in 1906, connected the navigable reaches of the Niger at Koulikoro with Kayes, whence the Senegal river is navigable during a part of each year. The second section was built subsequently to connect Kayes with Thies, the railhead of a formerly existing local line running out of Dakar, and this second section was constructed to a considerably higher standard than the first. Consequently, trains from Dakar to Koulikoro had to be divided into three parts at Kayes, as the Kayes—Koulikoro section then had 1 in 40 gradients, 492-ft. radius curves, and was laid with 44-lb. rails. In 1925 some easing of gradients and curves and relaying with 57-lb. rails were carried out, and in 1929 began a comprehensive reconstruction of this section, the grades then being reduced to 1 in 100 and the track laid with 66-lb. rails; this work was not completed until 1936. As the Moroccan section to Kenadsa is of standard gauge, and the Dakar—Niger section is of metre gauge, it is not clear what will be the gauge of the intervening 1,700 miles of line necessary to connect them. As the other line at Kenadsa running through western Algeria *via* Colomb Bechar, Méchéria, and Saida to Perregaux, giving an alternative connection with Oran, is of metre gauge, it is probable that the desert section will also be of that gauge, though possibly built with the prospect of later conversion to standard gauge.

PUBLICATIONS RECEIVED

Railway Posters and the War, No. 5. London: THE RAILWAY GAZETTE, 33, Tothill Street, S.W.1. 7¼ in. × 5 in. Price 6d. net.—The posters issued by the Railway Executive Committee and the railway companies have been reproduced in the series of articles entitled "Transport Services and the War," which appears weekly in THE RAILWAY GAZETTE, and afterwards reprinted in booklet form. Since No. 4 of this series of booklets was compiled, 11 months have passed and during that period the war has increased enormously both in geographical extent and in tempo. Among the posters reproduced in the latest booklet are those relating to the cancellation of additional holiday services in May, 1940, which were a repercussion of the German invasion of the Netherlands, Belgium, and Luxembourg in that month, and also to the further evacuation of certain coastal districts. The intensive German air attacks on this country which were waged throughout last summer and have since continued, although more recently largely at night, resulted in the widespread use of London tube stations by those seeking shelter, and a further consequence of these air raids has been the quickening of public interest in salvage, and in the raising of funds for the purchase of bomber and fighter aircraft. Passenger fares and rates have been increased on the direction of the Ministry of Transport. Posters relating to all these matters are reproduced in the present booklet.

Map of North-East Africa. Edinburgh: John Bartholomew & Son Ltd., The Geographical Institute, Duncan Street.—In the light of present war activities this map is particularly relevant, being as up-to-date as anything of the kind. In other respects it conforms to the usual high standard of Bartholomew's publications, and it is to a scale of 1 : 4,000,000. Levels above and below sea level are shown by orthographical contouring, and there are two useful insets (1) indicating the position of the mapped area relative to the whole of Europe, East Africa, and western Asia, and (2) showing the Nile delta to twice the scale of the main map.

Steels of High Creep Strength.—Hadfields Limited of Sheffield has issued a new catalogue (No. 446) describing steels of high creep strength for use at temperatures up to 550° C. We refer to this important subject in an editorial note on page 594.

THE SCRAP HEAP

£6,832 TAX OUT OF £10,000 SALARY

The man with the most responsible job in the world draws £3,168 a year. That estimate of Mr. Churchill's salary after he has paid taxes was made in Parliament recently by Mr. R. D. Denman (Nat. Lab., Central Leeds). If the House really desired the Premier to enjoy his salary of £10,000 he said, so high were taxes under the present Budget that they would have to vote him £266,960 a year.

* * *

During the recent War Weapons Week for Slough, Bucks, the members of the National Savings Group of G. D. Peters & Co. Ltd. helped in the remarkable total for the town of £976,800, by contributing just over £6 a head for the employees. The firm also runs a weekly savings campaign which has nearly 100 per cent. membership.

* * *

The Due West Railway, often called the nation's "most Christian Railroad" because its charter stated that no runs would be made on Sunday except in case of emergency, and no whisky would be hauled, recently was abandoned by permission of the Interstate Commerce Commission. The railway began operation in 1907. On one occasion, to rush a man to hospital, it ran on Sunday. It never killed or injured anyone, never had an accident, never faced a lawsuit and never knowingly hauled liquor. It's engine once ran on New York's elevated. The line is four miles long, from Due West to Donalds.—*From the "Mutual Magazine."*

* * *

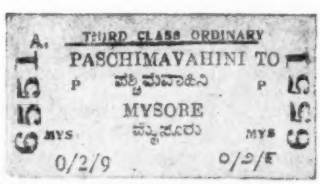
WAR SAVINGS CAMPAIGN

Reports in the War Savings Campaign show that employees of the Canadian National Railways have pledged themselves to contribute an amount of $190,475.25 a month, equal to an annual contribution of $2,285,703. The sale of War Savings stamps obtainable in ticket, telegraph, and other offices, is said to be more than doubled within the past month in comparison with sales made previously. Mr. W. W. Swinden, General Superintendent, Sleeping, Dining & Parlor car Services, C.N.R., has announced that in all cars where meals are served the steward has War Savings stamps for sale. It is believed that an appreciable sum can be secured through this source, particularly when the holiday season begins in earnest and tourists entering the Dominion are in search of a souvenir appropriate to Canada.

* * *

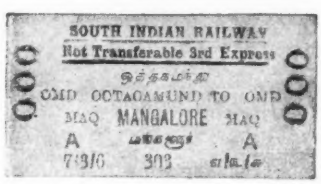
In a chapter entitled "Iron Horse" Mr. Arthur Bryant in his recent book *English Saga* traces the birth and growth of railways in this country. He states that a year after Queen Victoria's accession there were only 500 miles of railway in operation in the British Isles. Before 1840 the first railway boom added another 5,000 miles of projected route, of which 1,900 miles were opened before the end of 1843. This included lines from London to Birmingham, Manchester, Brighton, and Bristol.

Greville, writing in 1837, in his Memoirs, records how he travelled in 4½ hours from Birmingham to Liverpool to the races, sitting in a sort of chariot with two places and finding nothing disagreeable about it except the whiffs of sulphurous air. "Town after town, one park and chateau after another, are left behind with the rapid variety of a moving panorama." At every stopping place the platform resounded with astonished cries of "How on earth came you here!" One engineer, adds Greville in 1837, on the Liverpool—Birmingham line, reached the astonishing speed of 45 m.p.h., after which he was promptly dismissed by a prudent company!

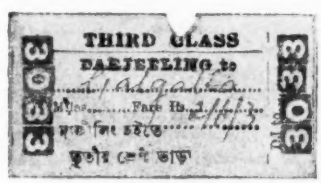


Madras & Southern Mahratta Railway ticket printed in English and Mahratti

Kutch Railway ticket overprinted with the ancient Hindu sign, the left-handed Swastika



Express train ticket of the South Indian Railway



Blank ticket of the Darjeeling-Himalayan Railway

Bi-lingual tickets in English and in various Indian dialects (four-fifths of full size), reproduced from "Passenger Tickets," by the late Professor Lionel Wiener

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

VICTORIA

The First "H" Class Locomotive

The first of the new "H" class 4-8-4 type locomotives* to be turned out of the Newport shops of the Government Railways, and bearing the number 220, was officially "launched" for service, on February 7, at the workshops, in the presence of a large and distinguished gathering, including the Minister of Transport, the three Railway Commissioners, Sir Harold Clapp, and Mr. A. E. Smith, a former Chief Mechanical Engineer of the department. Mr. Harris, the Chairman of the Commissioners, in an address commented on the excellence of the new engine and its size, and said that it was just another example of the very high standard for which Victorian railwaymen have been famous for many years.

The Minister of Transport, Mr. Hyland, expressed his pleasure and pride at the opportunity of introducing the locomotive, and said how proud the Government was of the job; he wished the engine all success. Sir Harold Clapp said the design and construction were grand achievements and a remarkable advertisement for Australian industry. The engine was then driven away by Mr. Hyland, the first Victorian Minister of Transport to possess a first-class engine driver's certificate.

An interesting comparison was staged at Spencer Street station, Melbourne, when No. 220 was on exhibition on February 15 and 16, and was inspected by over 10,000 people. For on the track in front of the great engine, was the prototype of the 0-6-0 type "T 94" class, built by the late Phœnix Foundry at Ballarat in 1884, and the oldest engine still working on the Government Railways. The public was able to file through the cabs of both locomotives. [The exhibition is illustrated on page 603.—Ed., *R.G.*]

CHINA

Tsingtao-Tsinan Railway

On the Tsingtao-Tsinan Railway, now worked as a section of the North China Railway, passenger traffic is increasing rapidly and additional trains are now run. Also through trains have been inaugurated between Tsingtao and Tientsin and Peking. These run over the Tientsin—Pukow section from Tsinan to Tientsin and thence over the Peking—Mukden section, all now controlled by the North China Company. The workshops at Ssufang, Tsingtao, were taken over by the North China Railway Car Manufacturing Company in 1940, this concern, like the North China Railway, being Japanese controlled.

*Described and illustrated in our issue of May 9.—Ed., *R.G.*

MEXICO

New Line Sanctioned

The Mexican Government has authorised the extension of the Fuentes Brotantes—Punta Penasco railway from the latter town to Santa Ana, a distance of 155 miles, and has sanctioned expenditure up to $2,125,000 for the purpose. This line will connect Lower California and the State of Sonora.

CEYLON

Substitute Fuel

The latest substitute fuel for use in locomotive fireboxes, with which experiments have recently been made on the Government Railway, is coconut poonac. So far, however, it has not proved satisfactory, conditions of economy, tender space, and difficulty in maintaining sufficient heat with it mitigating against its general use. There is a possibility of its being compressed into blocks or briquettes, and investigations are therefore continuing. Better results are also expected from the addition of certain chemicals to the poonac. Meanwhile, firewood is being used in greater quantities than ever before despite the trouble its sparks cause.

NORWAY

Locomotive Notes

Two new "Dovregubben" 2-8-4 tender locomotives [described in our issue of February 25, 1938 (p. 371), and the performance of which was recounted in that of January 26, 1940 (p. 132)—Ed., *R.G.*] have recently been supplied by Krupp and are now in service. Together with the original three, they are stationed at Trondelag. Two more are being built at the Thunes Foundry, Oslo. Meanwhile, owing to insufficient locomotive power, considerable difficulty is being experienced in meeting the demands of traffic on the State Railways, and the Reichsbahn has lent them ten large freight locomotives.

Wagons and Electric Locomotives on Order

Orders have been placed with the Strommens Verksted, Skabo Jernbanevognfabrikk, Oslo, and Eidsfoss Verk for a total of 700 wagons for the State system, and three electric locomotives are being built at Norsk Elektrisk & Brown Boveri works in Oslo.

UNITED STATES

The Illinois Central in 1940

Mr. J. L. Beven, President of the Illinois Central Railroad, in his fourth annual report to his co-workers on that system, outlined its principal achievements during 1940. Preparation for business inseparable from the national defence programme is the keynote of the report. On the operating side 3,000 new freight cars and 100 steel cabooses were ordered and nearly all were delivered. Alterations and heavy repairs to 5,700 freight cars and over 200 locomotives were carried out. One 2,000-h.p. diesel-electric locomotive was placed in service, and two of 2,700 h.p. and one of 1,000 h.p were ordered and their delivery was expected early this year. On December 18 the seven-car de luxe coach train, City of Miami [described in our issue of February 21 last—Ed., *R.G.*] was inaugurated.

Safety of Employees and Commercial Activities

Although injuries to employees rose from 454 (or 6·69 a million man-hours) in 1939 to 501 (or 7·02 a million man-hours) in 1940, fatalities were reduced by 28 per cent., and in the Paducah shops, employing 1,150 men, there was no reportable casualty despite the 1½ million man-hours worked.

On the sales side, several new collieries on the system were opened and coal traffic increased by over 10 per cent. Assistance was given in the establishment of important new defence industries on the system.

The Spending Departments

Stores purchases to the value of $26,400,000 were made during 1940, or over 21 per cent. more than in 1939; this figure included $11,263,000 for diesel locomotives and rolling stock. Extensive locomotive coaling and oil-fuelling plants were put down at various places. Six under- and nine over-bridges were built to eliminate level crossings, and four steel bridges were rebuilt; 151 miles of track were relaid with 112-lb. rails and about 2,000,000 sleepers were renewed.

The following table shows the principal items of financial interest in 1940 as compared with 1939:—

	1939	1940	Increase + Decrease −
	$	$	$
Revenues:—			
Freight	93,521,556	95,915,992	+ 2,394,436
Passenger	9,529,182	9,943,009	+ 413,827
Other transportation and incidental services	8,320,114	8,407,409	+ 87,295
Rents and interest	2,658,594	2,760,185	+ 101,591
Total	114,029,446	117,026,595	+ 2,997,149
Expenses:—			
Payrolls (current operations)	48,766,845	50,913,707	+ 2,146,862
Materials and other operating charges	32,879,858	35,052,572	+ 2,172,714
Taxes	10,157,597	10,053,207	− 104,390
Rents	5,028,534	4,872,811	− 155,723
Interest	14,860,837	14,837,679	− 23,158
Total	111,693,671	115,729,976	+ 4,036,305
Excess of Revenues over Expenses	2,335,775	1,296,619	− 1,039,156

ELECTRIC TRACTION SECTION

The Rome Underground

REPORTS indicate that although all work on the 1942 Rome exhibition has been stopped, construction of the underground electric railway to connect the Termini railway station with the exhibition grounds is being pressed forward. The route length will be seven miles and double track throughout, laid to standard gauge. Rails of 93 lb. a yd. are to be used, and the subway as a whole will be unique in using 3,000-volt d.c. collected by the trains from overhead wires. The original intention was to have a copper catenary of 100 sq. mm. area and a copper contact wire of 80 sq. mm., but there is a possibility that other materials may be tried in view of the wartime shortage of copper in Italy. Six rectifier substations are to be installed, each with a unit having a normal rating of 1,200 amp. at 3,200 volts; the 60-kV feeder line is to be led to a switching station near the city market halls. The highest peak load on the line has been reckoned as 30,000 kW. Trains are to consist of two motor-coaches with four trailers between, and each motor-coach is to be equipped with four traction motors having an individual continuous rating of 163 kW and a one-hour rating of 206 kW. Trains are to run at three-minute intervals, and at two-minute intervals during the peak of the rush-hour traffic. As each train is considered to have a carrying capacity of 1,300 passengers, the total capacity of the line in each direction will be a maximum of 39,000 an hour. A journey time of only 13 min. is to be allowed between the two terminal stations inclusive of intermediate stops, and statements have been made that the top speed will be as high as 100 km.p.h. (62 m.p.h.).

Advances in Motor-Bogie Technique

AN idea of the improvement which has been made in the construction of the driving bogies of motor-coaches can be gained in striking fashion by a brief comparison of salient points of designs made ten years ago and those evolved at the beginning of the war. For example, the riveted steel bogies for the 70-ton motor-coaches built for the suburban services of the P.O.-Midi and the Moroccan Railways weighed 9¼ and 8½ tons respectively without motors (225 kW), and were limited to a top speed of 56 m.p.h.; they had the usual form of transverse bolster supported on nests of helical springs. By contrast, the bogies of the fast single-unit motor-coaches built eight or nine years later for the Paris—Le Mans electrification weigh only 4¼ tons (motors of 155 kW) and are fitted to vehicles with a top speed of 80 m.p.h.; they have a fixed centre pivot mounted on Silentbloc bushings and the body weight is carried entirely at the sides through the medium of inverted laminated springs. In relation to the imposed weight, the early bogies weigh about 900 lb. per ton and the Le Mans bogies about 565 lb. per ton. A saving of 3,750 lb. a bogie has been made in the non-sprung weight, mainly by substituting chrome-molybdenum steel monobloc wheels for those of the tyred pattern, and this saving being in rotating weight it is worth nearly twice as much as an equivalent amount of non-rotating weight during accelerating and decelerating periods. The weight of the bogie frame structure —entirely welded—is only one ton in the Le Mans bogies and two tons in the earlier Moroccan bogies. A further saving has been made by the improvement in traction motor design and construction, and it has been estimated that a 20 to 30 per cent. saving in weight per h.p. has been made in the last 10 or 11 years. To make another comparison, a new type of motor bogie being tried on the Paris Metro at the beginning of the war weighed only seven tons inclusive of two traction motors each with a continuous rating of 180 h.p. at 20½ m.p.h. whereas a normal riveted and welded bogie with two ordinary motors weighed 8½ tons. Other up-to-date examples of modern motor-bogie construction are to be found in the Liverpool—Southport stock of the L.M.S.R. and on the surface and deep-level tube stock of the London Passenger Transport Board.

The Chicago Electroliners

THE new four-car articulated streamlined electric trains introduced by the Chicago, North Shore & Milwaukee Railroad represent the first American application of ultra-modern European practice in the construction of light-weight high-speed multiple-unit trains. Unlike the great majority of the Continental trains, the North Shore units operate on the low-tension d.c. system, and are unique in that the 600-volt current is collected from an overhead wire by means of trolley wheels. A safe top speed of 100 m.p.h. was adopted by the designers and hardly seems excessive in view of the numerous 65 to 70 m.p.h. start-to-stop schedules over short and medium distances which appear in the North Shore timetables; and for the same reason the provision of just over 11 h.p. per ton of tare weight is certainly justified. Apparently these trains are to be used for limited stop journeys over the Skokie Valley line (see map on p. 844 of the November 11, 1938, issue of this Supplement), and not for the frequent-stop inner suburban and similar trips, for only two entrance and exit doors are located on each side of a four-car train and this arrangement will not allow very rapid loading and unloading; the interior accommodation is certainly more in line with the semi-luxury travel demanded nowadays by the longer-distance season ticket holder. These new trains were illustrated and described in the May 2 issue of THE RAILWAY GAZETTE.

Traction Motor Heating

ALTHOUGH heat is more usually associated with steam locomotives than with electric traction, it is really the prime factor in the operation of an electrified system, for it is the heating of the traction motors and the methods used to dissipate the heat and keep the temperature within safe limits, which govern the performance of an electric locomotive or multiple-unit train over any given section of line. The more exact the knowledge of motor heating and cooling the greater is the potential improvement in motor and tractor performance. An important paper on this subject entitled "The Complete Analysis of Motor-Temperature Rise," was presented before the winter meeting of the American Institute of Electrical Engineers by Messrs. Fremont Felix and H. G. Jungk, respectively members of the staffs of G.E.C. and Westinghouse. The paper indicates how heat accumulates in the armature core and winding and in the commutator, how it may be transferred from one to the other, and how it may be dissipated by the circulation of air. Charts are given so that the motor temperature may be predetermined and correlated to electric locomotive performance. A series of shop tests is advocated for the type of motor which is to be used in any given locomotive class, and suggestions are made for subsequently using a locomotive intensively without causing unknown damage or deterioration of the traction motor insulation.

The Chilean Electrified System

One of the earliest high-tension d.c. conversions applied to a main line and fed from a hydro-electric generating plant

ELECTRIFICATION of the Chilean State Railways was mooted first directly as the result of the European war of 1914-19, which brought a shortage of fuel and a rise in price to $25 a ton. Moreover, increased traffic on certain sections made new motive power of one type or another essential. An investigation of the merits of electrification was begun in 1918, and the report recommended that conversion of the Valparaiso—Santiago and Las Vegas—Los Andes lines be undertaken. Tenders were asked in 1921, and bids were submitted by Westinghouse, American G.E.C., Oerlikon, and Siemens-Schuckertwerke. The contract was awarded to Westinghouse at a price of 57,518,482 pesos for the electrical equipment and its erection. Civil engineering and other work cost 82,169,268 pesos in addition, and a separate contract for the power supply was made with S. Pearson & Sons Ltd., the railway agreeing to take at least 30,000,000 kWh a year. Some years later a decision was made to convert the Santiago—Puerto Montt and Santiago—San Antonio lines, but contracts for the conversion have never been placed, although the proposals have been resuscitated from time to time, even as recently as this year.

Line Characteristics

Electric traction over the Valparaiso—Santiago line and the branch to Los Andes (the Chilean terminus of the Transandine Railway) began in 1924, the route length being 232 km. and the track length 374 km., all on the broad gauge of 5 ft. 6 in. The maximum grade is 2·25 per cent. (1 in 45), and there are many curves, the sharpest being 10 deg. (573 ft. radius). There are six tunnels, and all of these had to be increased in height to accommodate the overhead wires of the 3,000-volt d.c. system which was adopted, the conversion being one of the first commercial installations at this voltage and one of the first with traction motors wound for 1,500 volts d.c. The maximum altitude of the line is 800 m. (2,620 ft.).

Power Generation

The power company's hydro-electric station is located at Maitenes, on the Colorado river, at an altitude of 1,136 m. (3,720 ft.) in the lower slopes of the Andes. It houses three 8,125-kVA 6,600-volt 50-cycle three-phase generators driven at a speed of 600 r.p.m. by horizontal overhung single-discharge water turbines. The generated voltage is stepped up to 110 kV by three 6,000 kVA single-phase oil-insulated water-cooled outdoor transformers. In case of failure at the Maitenes station, traction power can be obtained from Florida hydro-electric station near Santiago or from the Mapocho steam station in that city.

Transmission

From the generating station a 60-km. two-circuit 110-kV transmission line leads to San Cristobal, near Santiago, where there is a switching station, and also a step-down plant to convert the 110 kV current to 12 kV for supply to the traction substation at Quilicura. The switching plant comprises four 7,500-kVA three-phase 50-cycle transformers and outdoor h.t. switchgear. A continuation of the 110-kV line goes from San Cristobal to Limache, 108 km., and thence to Miraflores, near Valparaiso, 35 km. There is another switching plant at Las Vegas, and at this plant the 110-kV current is stepped down to 44 kV in three 7,500-kVA transformers. Copper conductors are used on the Maitenes—San Cristobal and Limache—Miraflores transmission lines and steel-cored aluminium cables on the San Cristobal—Limache and Las Vegas—San Pedro lines.

Substations

Five rotary converter substations supply the tracks, and are located at Vina del Mar, San Pedro, Llai Llai, Rungue, and Quilicura. In each substation are two 2,000-kW motor-generator sets comprising a 2,840-h.p. three-phase 50-cycle 2,300-volt synchronous motor and two 1,000-kW 1,500-volt generators connected in series. The exciter for the synchronous motor has a rating of 28 kW at 125 volts and for the d.c. generator 10 kW at the same tension. The motor-generator sets are capable of a 200 per cent. overload for five minutes. For each motor-generator set there is a 2,500-kVA 44,000/2,300-volt oil-insulated transformer, 44-kV bus oil switches, and 2,300-volt motor control switches. The supply voltage for auxiliary light and power is taken from the 2,300-volt side of the main transformer through a selector oil switch and fed to a 37·5 kVA three-phase 50-cycle transformer, which furnishes power for the automatic blowers for ventilating the motor-generator sets, as well as the other auxiliaries.

Reinforced concrete is used for the substation buildings, which contain a motor-generator room having overhead cranes, and a high-tension equipment room, which houses switchgear and the transformers; control switching equipment is housed in the basement. Certain h.t. switchgear is mounted on a balcony in the motor-generator room.

Overhead Equipment

Simple construction characterises the overhead line, which consists merely of a ⅜-in. steel catenary supporting a single 4/0 copper contact wire through flexible steel hangers varying in length from 6 to 33 in. Except in tunnels the contact wire is 6 m. (19 ft. 8 in.) above rail level. The normal span between masts is 60 m. (196 ft.) on straight track. Reinforced concrete poles are used to a large extent; on double-track curves and in yards cross-span construction is used. There is an insulated air gap at the beginning and end of every passing track and a sectionalising switch in the feeder, so that if a fault occurs in any part of the catenary system the sectionalising switches at either end of the faulty length may be opened. The rails are connected by 4/0 Brown & Sharpe arc-welded bonds (211,600 circ. mills.) over the whole route except between Llai Llai and Yungai, where 300,000 circ. mill. welded bonds are used. In yards only one rail of the pair is bonded.

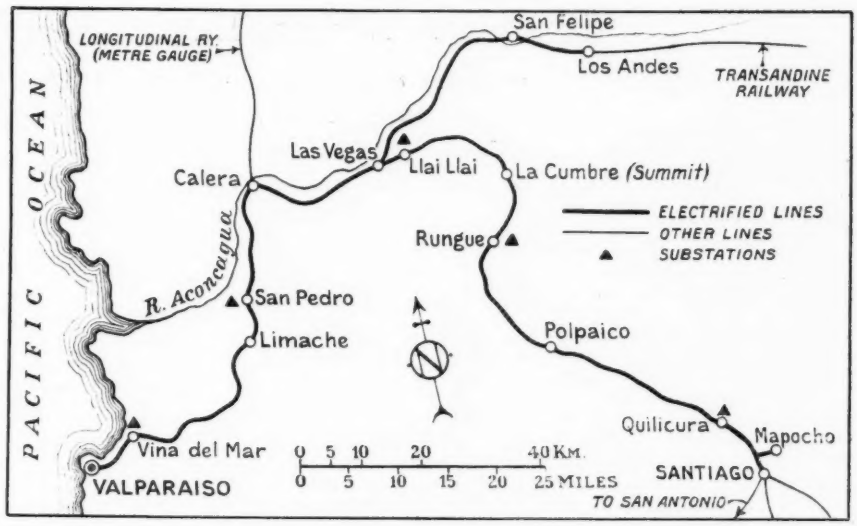
Motive Power

The original locomotives were 39 in number, and comprised 15 freight, six express passenger, 11 local passenger, and seven shunting locomotives. All have nose-suspended motors, and many of the electrical items are to a design common to two or more classes.

A wheel arrangement of Co + Co was adopted for the freight locomotives, which weigh 103 tons and have a starting tractive effort of 84,000 lb., giving a factor of adhesion of only 2·75. On the one-hour rating the output is 1,800 h.p., 31,200 lb. tractive effort at 21·5 m.p.h.; on the continuous rating the tractive effort is 24,360 lb. at 23 m.p.h. A top speed of 44 m.p.h. is permitted; the wheels are of 42 in. dia. and the flexible gears have a ratio of 15 : 63. The 1,500-volt force-ventilated motors have field control and are insulated for 3,000 volts. Regenerative braking can be used over a speed range of 31 to 8 m.p.h.

The express locomotives are of the 1-Co + Co-1 type; on the one-hour rating they have a capacity of 2,460 h.p., 25,800 lb. tractive effort at 36 m.p.h.; the continuous rating figures are 19,800 lb. at 39¾ m.p.h. The starting effort is 70,800 lb., the adhesion weight 94 tons, the total weight 116 tons, and the top speed 63 m.p.h. The driving wheels are 42 in. in dia. and are driven by flexible gears with a ratio of 21 : 56. Regenerative braking is effective over a speed range of 50 to 20 m.p.h. 300-ton trains are hauled by

Map of the area between Valparaiso and Santiago, showing the electrified line of the Chilean State Railways between those two cities, and also the electrified Transandine branch



these locomotives between Valparaiso and Santiago, and with 2,700 volts in the contact wire the free running speed on the level is 100 km.p.h. (62 m.p.h.), and up the 1 in 45 grade 33 m.p.h.

The usual Bo + Bo layout was adopted for the 72-ton local passenger locomotives which have a one-hour rating of 1,640 h.p., 17,200 lb. tractive effort at 36 m.p.h.; the continuous rating is 13,200 lb. at 39¾ m.p.h., the starting tractive effort 47,200 lb., and the top speed 56 m.p.h. The motors and wheels are the same as those of the passenger locomotives, but no regeneration equipment is installed.

Four traction motors with an aggregate one-hour rating of 640 h.p. are fitted to the Bo + Bo shunting locomotives, which weigh 61 tons; on the one-hour rating the tractive effort is 23,000 lb. at 10½ m.p.h. and on the continuous rating 11,000 lb. at 12¾ m.p.h. The starting tractive effort is 56,000 lb., the top speed 35 m.p.h., the wheel dia. 42 in., and the gear ratio 16 : 63.

The Savings Brought by Electrification

AMONG the items which bring about a reduction in operating cost when a steam line is converted to electric traction, particularly when electric locomotives are used, may be listed the following:

(1) . . . The number of electric locomotives necessary to handle a given traffic is nearly always less than the number of steam locomotives required. As an electric locomotive costs about the same as a steam locomotive per rail horsepower, the investment in electric motive power is not excessive. Moreover, the reduced number of units leads to a diminution in shed and maintenance costs.

(2) . . . The maintenance cost per horsepower-mile of an electric locomotive is much less than that of a steam locomotive, and in a number of installations the total cost of maintaining the electric locomotives has been approximately half that of maintaining the previous steam locomotives.

(3) . . . The availability for service of an electric locomotive is usually 85 to 90 per cent. contrasted with 60 to 65 per cent., or sometimes only 50 per cent., of steam locomotives, and it is mainly, but not entirely, this factor which enables a given traffic to be handled by fewer electric than steam locomotives.

(4) . . . As an electric locomotive can be given an overload when its speed would be reduced by up grades, and may develop up to twice its normal output for short periods, *e.g.* during acceleration, a given tonnage can be moved over the track at a considerably higher schedule speed than with steam locomotives. This may result in a reduction in the number of train hours and in the wages of the locomotive and train crews.

(5) . . . The maintenance of the overhead wires, transmission lines and substations forms an appreciable item in the operating cost with electric traction, but generally this expense does not differ greatly from that of maintaining the coaling and watering plants associated with steam traction.

It is not safe to assume that the cost of power for electric traction is much less than the cost of fuel for steam traction. Frequently the cost of the two is about the same, and this may be due to cheap coal, to maximum-demand clauses in the power contract, or simply to the high financial charges of the generating station having to be recouped from the consumer.

The general result of all the foregoing considerations is that electric traction always shows an operating saving when compared with steam traction, and the decision to electrify or not is dependent upon the yearly financial charges of the whole scheme. In a mathematical form given by Mr. A. M. Wright before the American Institute of Electrical Engineers, conversion is justified when

$$Cs > F/D + Ce$$

in which Cs is the operating cost per ton-mile with steam traction, and Ce the corresponding figure with electric traction; F is the total annual fixed charges on the capital invested in electrification, and D the total ton-mileage a year. In any well laid out conversion scheme Ce will always be less than Cs, so that the factor governing electric operation is the value of F/D.

WEDGLOCK COUPLERS.—G. D. Peters & Co. Ltd., of Slough, asks us to state that its Wedglock automatic coupler is *not* fitted to the new electric stock of the Waterloo & City Railway, as was stated in our article published in the Electric Traction Section dated April 4.

SOVIET ELECTRIC LOCOMOTIVE.—Another nebulous claim for the most powerful electric locomotive in Europe has been made lately by the Russia Today Press Service. But the output is said to be 4,000 kW (5,350 h.p.), and if this be taken as the one-hour rating the locomotive will scarcely be more powerful than the last Reichsbahn 1-Do-1 class and a good way behind at least three Swiss Federal Railways' electric locomotives. On the other hand the Soviet design may lead the way as regards Continental 3,000-volt d.c. power units. Construction of the first locomotive is said to be under way at the Dynamo Works, Moscow. The top speed is to be over 100 m.p.h. and the maximum haulage capacity 22 passenger coaches.

South African Electrification

A summary of some up-to-date figures taken from the South African Railways & Harbours Magazine

THE introduction of full electric working between Daimana (now Danskraal) and Mooi River, a distance of 73 miles, on May 28, 1925, marked the initiation of a project which has not ceased to develop, and today the mileage of electrified lines has reached the figures shown in Table I. The proportion of the administration's rolling stock assets which is now electric is large, and Table II shows the numbers in service.

The erection of motor-coaches and electric locomotives, and the wiring of driving and plain trailers, together with the maintenance—including light and heavy overhauls of motor-coaches and electric locomotives—of all these vehicles is undertaken entirely by the electrical branch in so far as the electrical equipment and its auxiliary gear are concerned. The maintenance of overhead track equipment forms an important function of the electrical department, as does the operation and maintenance of the mercury-arc rectifier substations on behalf of the Electricity Supply Commission.

With the exception of the erection of the substation buildings, all construction work in connection with the electrification

TABLE I

System	Miles open		Miles under conversion		Total miles	
	Route	Track	Route	Track	Route	Track
Natal	405	680	23	33	428	713
Cape Western	45	117	—	—	45	117
Western and Eastern Transvaal	132	393¼	12	59¼	144	453
Total	582	1,190¼	35	92¼	617	1,283

of railways is undertaken by the electrification construction organisation. This work includes the design, fabrication and erection of steel structures to carry the overhead equipment of track. Masts of various types, either flat, triangular or square, are fabricated from otherwise scrap rails with batten plates cut from old steel sleepers electrically welded thereto. Lattice and suspension type bridges up to 125 ft. in length are constructed of channel-iron, latticed by means of old boiler tubes, electric-arc welded to form lattice girders. The construction of e.h.t. transmission lines, using standards or towers designed and fabricated by the department, is undertaken both on behalf of the Administration and the Electricity Supply Commission throughout the Union.

The use of the heavy-duty high-voltage, steel tank mercury-arc rectifier for traction purposes has largely contributed to

TABLE II

System	Electric locos	Motor-coaches	Trailers		Total
			Plain	Driving	
Natal	163	—	—	—	163
Cape Western	—	96	171	74	341
Western and Eastern Transvaal ...	17	119	201	63	400
Total	180	215	372	137	904

the development of electric traction in South Africa, on account of its low initial and maintenance costs. Indeed, the South African Railways Administration, through its electrical branch, has pioneered the use of the mercury-arc rectifier for inversion to provide for regenerative braking, which has proved a big success in Natal where heavy freight trains are handled safely and speedily on mountain gradients of 1 in 30 without resorting to the use of mechanical brakes.

The manufacture in the electrical shops of all types of equipment, including instruments such as relays, of extreme sensitivity, is of considerable moment. The relays for the remote operation of the mercury-arc rectifier substations in Natal are being manufactured departmentally, and this may be regarded as something of an achievement.

A matter of some interest, and perhaps surprising at first sight, is that no less than 25 per cent. of the total traffic hauled on the South African Railways is now hauled by electric traction.

Notes and News

American Electric Locomotives.—The Illinois Terminal Railroad has put into traffic one 1,800 b.h.p. electric freight locomotive built in the company's shops, and with electrical equipment purchased outside. The Nevada Consolidated Copper Company has ordered two 970 h.p. locomotives from G.E.C., and the Phelps-Dodge Corporation nine electric freight locomotives from Baldwin. Five more express passenger locomotives are being built by the Pennsylvania in its own shops for service on the 11-kV 25-cycle single-phase lines, and the New York, New Haven & Hartford is purchasing another five a.c. Westinghouse electric locomotives.

French Conversion Proposals.—It has been reported from Vichy recently that the 317-mile main line of the ex-P.L.M. Railway between Paris and Lyons is to be electrified. Proposals for the conversion of the section between Paris and Dijon, including the 80-mile ascent from Laroche to Blaisy-Bas in the southbound direction, were being examined before the war. The latest report claims that a coal saving of 500,000 tons a year would be effected, but the further claim that a saving in time of one to two hours by electrification seems rather optimistic, for the pre-war steam schedules were by no means slow.

Electrification in Italy.—It seems that to a limited extent the electrification of the Italian State Railways on the 3,000-volt direct current system, and the development of the power generating and distributing networks is still being carried out, although naturally at a much reduced rate Rome radio recently claimed that 55 per cent. of the State lines were now electrified, giving a yearly saving in coal amounting to 2,000,000 tons; further lines were to be converted under a new programme designed to speed up the war-time rate of conversion. Towards the end of last year a new subterranean hydro-electric plant at Bressanone was opened by the Italian Minister of Communications. It is intended principally to supply energy to the electrified lines in the Alto Adige, but will also furnish industrial current in that area. The plant is driven by water from two rivers, and all the generating and control machinery is housed in caverns excavated in the mountains.

Swedish Conversions.—Electric working over the Långsele—Mellansel section (57 miles) of the Swedish State Railways northern line to Boden began on September 19, 1940, and it is understood that electric traction was introduced on the 74-mile Mellansel—Vännäs section in February of this year. It is hoped to complete conversion as far north as Boden, where the already electrified Lapland iron ore line is joined, by the middle of 1942. It will then be possible to travel from Trälleborg in the south, *via* Stockholm, to Narvik in the north, 1,376 miles, entirely by electric train. The whole journey, except for the last 28 miles to Narvik, will be over the Swedish State Railways. The conversion cost for the 309 miles from Mellansel to Boden is estimated at 15,000,000 kr. The current year's budget includes a sum of 2,500,000 kr. for electric locomotives, and the expenditure of a further 5,000,000 kr. for electric locomotives is envisaged during the next few years.

First "H" Class Locomotive, Victorian Railways

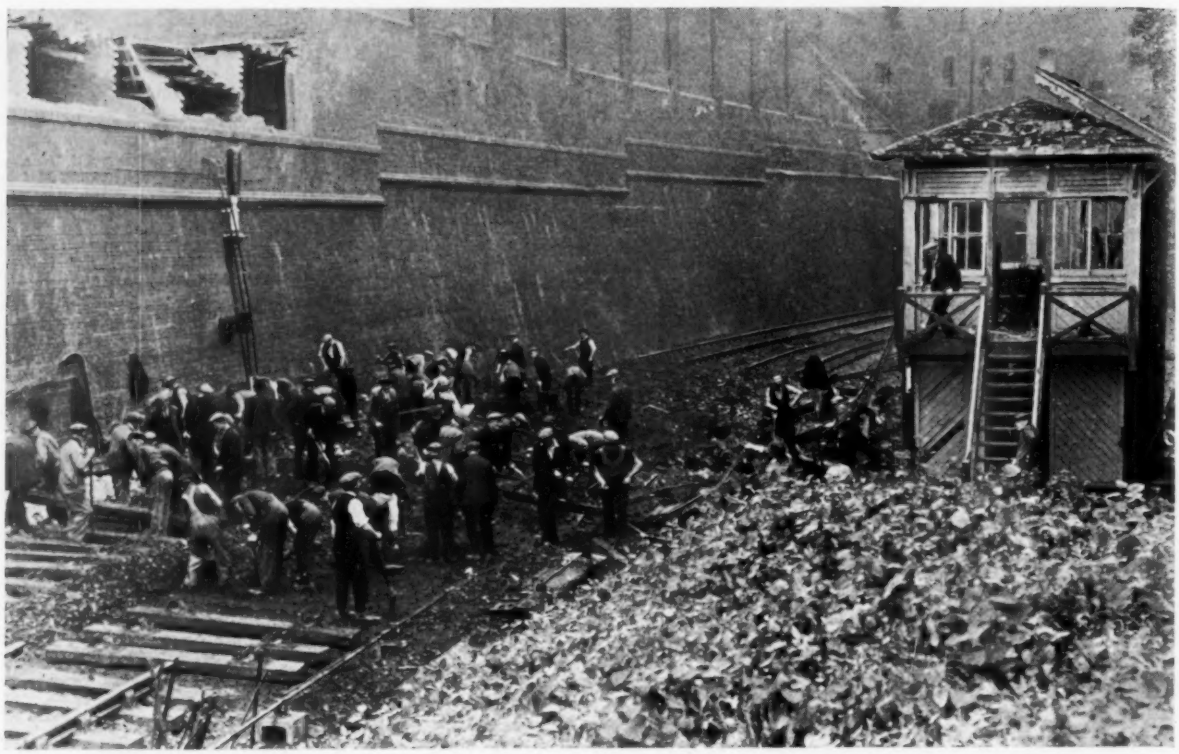
(See page 598)

Exhibition at Flinders Street station, Melbourne, of No. 220, the first of the new "H" class 4-8-4 type locomotive, Victorian Government Railways, together with "T 94" class 0-6-0, the oldest engine still running on the system, for sake of comparison by the 10,000 visitors, who walked through the cabs of both engines

U.S.A. Express Derailed

The Buckeye, a five-car Cleveland-Pittsburgh express of the Pennsylvania Railroad, when travelling at about 65 m.p.h. on March 16, became derailed near Baden, Pennsylvania, and was partly thrown down a 30-ft. embankment into the Ohio river. Five persons, including the engine driver, were killed and 73 were treated for shock. Sabotage is thought to have been the cause, as the spikes holding one of the rails to the sleepers had been removed and the fishplates taken off. The bond wires were not broken, so that no warning was given by signal. The picture illustrates how well the all-steel coaches survived the shock. There are four tracks at the point of derailment, and The Buckeye was on that next to the river. The line is straight, and the locomotive kept to the formation although turning over on its side

British Railways and the War—71



Filling in bomb crater at end of tunnel on one of the L.N.E.R. main lines

The same spot after repair

RAILWAY NEWS SECTION

PERSONAL

GREAT WESTERN RAILWAY

The directors have appointed Mr. F. W. Hawksworth to be Chief Mechanical Engineer, *vice* Mr. C. B. Collett, who will retire on July 5.

Mr. F. C. E. Hockridge, Assistant Surveyor & Estate Agent, has been appointed Deputy Surveyor & Estate Agent.

THE RAILWAY COMPANIES' ASSOCIATION

Mr. G. Cole Deacon, Secretary to the association, having been appointed Secretary to the Railway Executive Committee, under an Order of the Minister of Transport dated September 1, 1939, the association has appointed Mr. H. A. Chapman to be Acting-Secretary. All communications should be addressed in future to: The Acting-Secretary, Railway Companies' Association, 4, Cowley Street, Westminster, S.W.1, where temporary accommodation has been arranged. The telephone number is Whitehall 1502.

INSTITUTE OF TRANSPORT

The council of the Institute of Transport has approved the following elections of members :—

Members

Mr. Charles Norwood Anderson, Assistant Divisional Superintendent (Southern), Southern Railway.

Mr. Harold Muscroft, General Manager & Engineer, Huddersfield Corporation Transport.

Mr. Leo Henry Kent Neil, London City Manager, L.N.E.R.

Mr. Alexander Balmain Bruce Valentine, Commercial Officer, London Passenger Transport Board.

Associate Members

Mr. William Robertson Flight, Acting Deputy Traffic Superintendent, Bombay, Baroda & Central India Railway.

Mr. John Drake Parker, District Manager (Guildford), Aldershot & District Traction Co. Ltd.

Mr. Pierre Johan Hendrik Theron, South African Railways & Harbours.

Associate

Mr. Michael Robert Bonavia, University of London.

L.N.E.R. APPOINTMENTS

Mr. H. S. Davies, District Engineer, Leeds, has been appointed District Engineer, King's Cross, in succession to Mr. C. F. Slade.

Mr. A. K. Terris has been appointed Acting District Engineer, Leeds, to succeed Mr. Davies.

Mr. A. Curry, Senior Assistant, Engineer's Office, Southern Area, is to be Acting Assistant District Engineer at Leeds in succession to Mr. Terris.

Mr. C. Wright has been appointed Acting District Engineer, Nottingham, in succession to Mr. E. J. J. Swindells.

Mr. R. C. Bond, A.M.Inst.C.E., M.I.Mech.E., M.I.Loco.E., who, as announced in our May 9 issue, has been appointed Superintendent of Crewe locomotive works, London Midland & Scottish Railway, in succession to Mr. F. A. Lemon, who has retired, served his apprenticeship and pupilage at Derby locomotive works from 1920 to 1925. From 1925 to 1928 he was Works Inspector in charge of the inspection of new locomotives under construction for the L.M.S.R. by locomotive building firms. In 1928 he left the railway service and was appointed Assistant Works Manager of the Vulcan Foundry locomotive works, occupying that position for three years. During 15 months of this period he was in India in charge of a contract for electric locomotives for the Great Indian Peninsula Railway main-line electrification. In 1931 he returned to the L.M.S.R. service, when he was appointed Assistant Works Superintendent, Horwich. In 1933 he became Assistant Works Superintendent, Crewe locomotive works. In 1937 he was made Superintending Engineer of the Joint L.M.S.R. and L.N.E.R. Locomotive Testing Station, and on the outbreak of war in 1939 he was appointed Acting Mechanical & Electrical Engineer, L.M.S.R., Scotland.

Mr. R. C. Bond

Appointed Superintendent of Crewe Locomotive Works, L.M.S.R.

We regret to record the death on May 23 of Lord Austin, Founder & Chairman of the Austin Motor Co. Ltd. He was in his 75th year.

Col. (temp. Brig.) D. J. McMullen, C.B.E., D.S.O., M.I.Mech.E., Director of Transportation, War Office, has been granted the acting rank of Major-General, May 15, 1941.

Mr. J. Rankin, Assistant Works Superintendent, Derby (Loco.), L.M.S.R., who, as recorded in our May 16 issue, has been appointed Works Superintendent, Derby, served his apprenticeship with Andrew Barclay, Sons & Co. Ltd., of Kilmarnock. He served from 1914 to 1919 with the Forces, and in 1920 joined the Midland Railway Company, Derby. In February 1923, Mr. Rankin was appointed Works Inspector at Derby; in May, 1928, Assistant to the Works Manager, Crewe; in 1932 Assistant to the Works Superintendent, Crewe; in 1934 Assistant Works Superintendent, Horwich; and in 1938 became Assistant Works Superintendent, Derby. From September, 1939, until July, 1940, Mr. Rankin acted as Works Superintendent, Derby, during Colonel Bellamy's absence on Government service. Mr. Rankin is an Associate Member of the Institution of Mechanical Engineers, and a Member of the Institution of Locomotive Engineers and of the Institution of Production Engineers.

Mr. J. Rankin

Appointed Works Superintendent, Derby (Loco.), L.M.S.R.

INDIAN RAILWAY STAFF CHANGES

Mr. J. Mackinnon, C.I.E., Chief Engineer, N.W.R., has been permitted to retire from Government service as from January 30.

Mr. H. Wood Robinson has been confirmed as Deputy Chief Controller of Standardisation (Civil) Railway Board.

Mr. H. A. [illegible]celyne, Senior Government Inspector of Railways, has been

granted 1½ months' leave preparatory to retirement, as from March 6.

Lt.-Colonel H. H. F. Gosset has been appointed to officiate as Senior Government Inspector, Circle No. 1, Calcutta, in place of Mr. Joscelyne, as from the same date.

Mr. S. B. Ram Singh, Officiating Deputy Chief Engineer, N.W.R., has been granted 9½ months' leave preparatory to retirement as from March 1.

Mr. David Blee, District Goods Manager, Liverpool, G.W.R., whose appointment as General Assistant to the Chief Goods Manager, Paddington, was recorded in our May 2 issue, began his career with the company in 1916 in the Chief Goods Manager's Office, Paddington. Apart from a break of two years with H.M. Forces, Mr. Blee remained in this department until 1932, when he was transferred to Slough as Goods Agent. After a period as Chief Clerk, Exeter District, he was appointed Assistant District Goods Manager, London, and from 1936 to 1939 was District Goods Manager, Shrewsbury. In February, 1940, he became District Goods Manager, Liverpool, the post he now vacates to take up his new appointment.

Mr. David Blee

Appointed General Assistant to the Chief Goods Manager, Paddington, G.W.R.

Mr. F. L. C. Bond, Vice-President & General Manager, Central Region, C.N.R., has been elected President of the American Railway Engineering Association.

Mr. Thomas E. Bond, Vice-President of the Elgin, Joliet & Eastern Railway, has been appointed President in succession to Mr. Scott M. Rogers, who retired on May 1.

We regret to record the death, on May 20, of Mr. John Triffitt who at the time of his retirement in 1928 was Assistant Engineer for New Works, North Eastern Area, London & North Eastern Railway. Mr. Triffitt, who was 78 years of age, had been for many years Assistant Engineer, Way & Works, of the North Eastern Railway, and was appointed Assistant Engineer for New Works upon the formation of the London & North Eastern Railway.

Mr. A. E. le Cheminant, Assistant District Goods Manager, London, G.W.R., who, as recorded in our May 2 issue, has been appointed District Goods Manager, Liverpool, joined the company's service in 1908 at Guernsey, and was transferred to headquarters seven years later. After four years with H.M. Forces, he returned to Paddington and in 1928 was transferred to New York as Assistant General Agent (Freight). In 1930 he returned to England and became principal clerk in the Chief Goods Manager's Development Department, and in the next year was appointed Chief Clerk to the District Goods Manager, Liverpool. In 1935 he became Assistant District Goods Manager, London.

Mr. A. E. le Cheminant

Appointed District Goods Manager, Liverpool, G.W.R.

Mr. W. M. Hitchcock is to succeed Mr. le Cheminant as Assistant District Goods Manager, London, G.W.R. He entered the service of the company in 1909 at Paddington goods station, and four years later was transferred to High Wycombe and subsequently to the District Goods Manager's Office, Reading. After a further period at High Wycombe he was transferred, in 1923, to the Chief Goods Manager's Office, where he was engaged in the Accounts and Parliamentary Sections successively. In 1928 he was appointed Goods Agent at Malvern and six years later returned to headquarters, where he was associated with special duties concerning closer working and pooling arrangements. Early in 1940 he became Clerk-in-Charge of the Working Department, Chief Goods Manager's Office.

Mr. Alfred E. Perlman, Engineer, Maintenance of Way, Denver & Rio Grande Western Railroad, has been appointed Chief Engineer in succession to Mr. Arthur O. Ridgway, who retired on May 1.

Mr. Kenneth B. Duncan, Chief Engineer, Gulf Colorado & Sante Fe Railway, retired on March 31. He is being succeeded by Mr. W. W. Wilson, formerly a Division Engineer on the railway.

Mr. Thomas D. Beven, General Manager, Elgin, Joliet & Eastern Railway, has been appointed Vice-President, with headquarters at Chicago.

Mr. W. M. Hitchcock

Appointed Assistant District Goods Manager, London, G.W.R.

The Late Lord Stamp

In the U.S.A. *Congressional Record* for April 25 appears a report of tributes paid to the late Lord Stamp in the United States Senate. The matter is referred to in an editorial note at page 593.

Award of the Albert Gold Medal

The Council of the Royal Society of Arts, with the approval of its President, H.R.H. the Duke of Connaught, has decided to confer on His Excellency Franklin Delano Roosevelt, President of the U.S.A., the Albert Gold Medal of the society "in recognition of his pre-eminent services to humanity as the fearless and resolute champion of the ideals of national freedom and individual liberty."

The Albert Medal of the Royal Society of Arts was struck in 1864 to commemorate the presidency of the society which was held by Prince Albert from 1843-1861. It is awarded for "distinguished merit in promoting arts, manufactures, and commerce." Among previous recipients are Their Majesties Queen Victoria, King Edward VII, and King George V, Thomas Edison, Orville Wright, Louis Pasteur, Guglielmo Marconi, and Madame Curie.

TRANSPORT SERVICES AND THE WAR—92

British wartime train services—U.S.A. fare reductions for servicemen—German train service restrictions—Norwegian railway reconstruction and gauge conversion

British railways are still able to provide long-distance train services with a high standard of speed and frequency, as shown in the accompanying table. Previous tables were in our September 29, October 6, 13, and 20, 1939, issues (setting out the first war emergency services); February 23, 1940, issue (dealing with the great improvements of December, 1939, and January and February, 1940); and December 27, 1940, issue (recording the modifications introduced with the October 28, 1940, timetables). The present table brings the comparison forward to the 1941 summer timetables of the four main-line railways, which became effective from May 5. As previously, comparison is made with the final October, 1918, train services of the last war, and with the normal winter services in force immediately prior to the present war, in October, 1938. This time the transitional stage of last October is omitted. The table shows how excellently the position established by February, 1940, is still being maintained in May, 1941, despite all that has happened in the interim, and especially the intensive bombing of this country which began in the summer of 1940. The tendency in general has been to increase slightly the frequency of service rather than to reduce it, and little slowing of journey times is apparent.

The restaurant car position also shows improvement. At the time of the restoration of such services, just before the end of 1939, the number of restaurant, buffet, and Pullman car trains totalled 365 daily; since then no fewer than 75 workings have been added, making the present daily total 440.

NUMBER OF RESTAURANT, BUFFET, AND PULLMAN CAR TRAINS RUNNING DAILY OVER BRITISH RAILWAYS IN FEBRUARY, 1940, AND MAY, 1941

Railway	Section	Restaurant cars		Buffet cars		Pullman cars		Total	
		Feb. 1940	May 1941	Feb. 1940	May 1941	Feb. 1940	May 1941	Feb. 1940	May 1941
L.M.S.R.	West Coast Services ...	8	10	—	—	—	—	8	10
	Western Division ...	38	42	—	—	—	—	38	42
	Midland Division ...	22	22	—	—	—	—	22	22
	Scottish Services ...	16	16	—	—	—	—	16	16
	N.C.C. (Ireland)	—	—	10	10	—	—	10	10
	L.M.S.R. totals	84	90	10	10	—	—	94	100
L.N.E.R.	East Coast Services ...	13	15	—	4	—	—	13	19
	Great Northern Section	10	12	2	4	—	—	12	16
	Great Eastern Section ...	22	16	2	10	—	—	24	26
	Great Central Section ...	—	—	6	14	—	—	6	14
	North Eastern Area ...	4	4	32	42	—	—	36	46
	Scottish Area	8	10	—	16	—	—	8	26
	L.N.E.R. totals	57	57	42	90	—	—	99	147
	G.W.R. totals	40	40	12	12	—	—	52	52
S.R.	Western Division ...	36	47	—	—	—	—	36	47
	Central Division ...	—	—	24	24	36	48	60	72
	Eastern Division	—	—	—	—	24	22	24	22
	S.R. totals	36	47	24	24	60	70	120	141
	Grand totals	217	234	88	136	60	70	365	440

FASTEST AND AVERAGE TIMES AND FREQUENCY OF SERVICE BETWEEN LONDON AND VARIOUS PROVINCIAL CENTRES IN 1918, 1938, 1939, 1940, AND 1941

London and :—	Distance	Fastest times					No. of trains daily					Average times				
		Oct. 1918	Oct. 1938	Oct. 1939	Feb. 1940	May 1941	Oct. 1918	Oct. 1938	Oct. 1939	Feb. 1940	May 1941	Oct. 1918	Oct. 1938	Oct. 1939	Feb. 1940	May 1941
	Miles	h.m.	h.m.	h.m.	h.m.	h.m.						h.m.	h.m.	h.m.	h.m.	h.m.
L.M.S.R.																
Leicester	99·1	2 15	1 39	2 31	2 10	2 10	18	30	16	18	20	2 33	1 48	2 46	2 35	2 38
Birmingham	112·9	2 40	1 55	2 41	2 24	2 24	11	20	15	18	17	2 53	2 05	3 10	2 51	2 51
Nottingham	123·5	2 55	2 03	3 06	2 45	2 45	12	21	12	15	15	3 07	2 25	3 31	3 14	3 15
Sheffield	158·5	4 01	2 56	4 25	3 49	3 47	12	20	10	14	14	4 24	3 12	4 44	4 20	4 19
Manchester (*a*)	188·5	4 35	3 15	4 32	3 50	4 08	16	22	14	18	19	5 10	3 43	4 52	4 34	4 35
Liverpool	193·7	4 40	3 15	4 40	4 10	4 10	12	14	12	12	13	5 03	3 39	5 02	4 34	4 32
Leeds	196·0	4 47	3 48	5 35	4 44	4 44	12	16	8	12	12	5 25	4 06	6 03	5 27	5 29
Glasgow	401·4	9 30	*6 30	9 35	8 45	8 45	6	12	6	6	7	10 20	8 06	10 04	8 53	8 58
Perth	450·4	10 10	8 41	11 12	10 05	10 06	6	8	4	4	6	11 19	9 30	11 31	10 25	10 46
Inverness	568·4	15 55	13 00	16 14	14 22	14 26	3	4	2	2	3	16 28	14 30	16 26	14 56	15 59
L.N.E.R.																
Cambridge (*e*)	55·7	1 19	1 05	1 33	1 26	1 22	15	40	16	24	24	1 34	1 20	1 43	1 42	1 40
Peterborough	76·4	1 38	1 16	1 42	1 32	1 33	22	30	18	27	27	1 50	1 30	1 50	1 56	1 37
Norwich	115·0	2 52	2 10	3 18	2 50	2 38	14	18	12	15	14	3 42	2 50	3 26	3 20	3 11
Nottingham (*b*)	126·5	2 27	2 16	3 17	3 07	3 05	16	18	12	14	17	2 57	2 38	3 36	3 22	3 29
Sheffield (*b*)	164·7	3 22	3 00	4 27	3 50	4 00	14	21	14	15	15	4 02	3 29	5 12	4 20	4 26
Leeds	185·8	4 32	*2 43	4 28	4 20	4 16	10	18	8	12	12	4 52	3 37	5 00	4 39	4 41
Hull	196·9	4 55	3 30	5 20	4 35	4 35	10	14	5	14	14	5 29	4 06	5 32	5 06	5 16
Newcastle	268·3	5 55	*3 57	6 31	5 39	5 45	12	21	12	13	16	6 40	5 15	6 56	6 04	6 08
Edinburgh	392·7	9 40	*6 00	9 40	8 25	8 30	8	15	8	9	9	9 52	7 46	10 08	8 57	8 55
Aberdeen	523·2	13 30	†9 45	13 45	12 21	12 20	5	12	5	8	7	15 04	11 53	14 52	13 00	12 59
G.W.R.																
Oxford	63·5	1 18	1 00	1 28	1 25	1 25	14	26	20	26	27	1 30	1 20	1 39	1 42	1 45
Birmingham	110·6	2 30	2 00	2 33	2 28	2 28	10	14	8	11	10	2 46	2 05	2 51	2 33	2 34
Bristol	118·3	2 15	1 45	2 35	2 30	2 30	16	20	14	18	20	2 45	2 15	2 58	2 51	3 02
Worcester	120·4	3 06	2 10	3 06	2 53	2 53	8	12	8	10	9	3 41	2 37	3 20	3 17	3 09
Cardiff	145·1	3 10	2 41	3 15	3 03	3 03	10	14	8	12	10	3 23	2 55	3 23	3 16	3 20
Weymouth	168·8	3 45	3 07	4 08	4 08	4 10	6	12	9	9	10	4 22	3 59	4 51	4 43	4 49
Exeter	173·5	3 30	2 50	4 30	3 30	3 30	15	19	11	11	11	4 31	3 42	4 52	4 05	4 08
Swansea	190·9	4 35	3 57	4 40	4 30	4 30	10	14	9	12	10	5 07	4 08	4 57	4 40	4 51
Plymouth (North Road) ...	225·5	5 00	4 05	5 45	4 51	4 55	8	12	9	10	11	5 39	4 44	6 26	5 13	5 17
Penzance	305·0	7 55	6 30	8 35	7 30	7 30	6	9	6	6	6	9 11	7 18	9 35	8 17	8 20
S.R.																
Brighton	50·9	1 15	1 00	1 00	1 00	1 00	34	100	46	53	47	1 30	1 09	1 11	1 11	1 11
Hastings (*c*)	62·4	1 48	1 32	1 38	1 38	1 40	25	50	22	22	26	2 27	1 52	1 59	1 57	1 59
Portsmouth (*d*)	73·6	2 12	1 30	1 37	1 37	1 37	24	45	40	40	40	2 53	1 38	1 58	1 58	1 57
Margate	73·9	2 04	1 30	1 38	1 38	1 53	18	28	20	21	17	2 34	2 03	2 20	2 08	2 15
Dover	77·3	2 27	1 32	1 52	1 55	1 55	17	32	22	22	20	2 46	2 06	2 19	2 15	2 11
Southampton	79·2	1 43	1 25	1 46	1 35	1 35	20	28	20	20	20	2 16	1 50	2 03	1 59	1 58
Salisbury	83·8	1 43	1 26	1 48	1 42	1 42	15	26	16	17	17	2 15	2 02	2 08	2 04	2 03
Bournemouth	107·9	2 39	1 56	2 30	2 15	2 15	12	26	17	18	18	2 52	2 33	3 04	2 58	2 58
Exeter	171·8	3 57	3 09	3 50	3 38	3 38	11	13	9	11	11	4 38	3 42	4 15	4 09	4 05
Plymouth (North Road) ...	230·9	5 55	4 43	6 06	5 52	5 53	8	12	7	9	9	6 32	5 45	6 22	6 17	6 22

(*a*) *Via* Western and Midland routes. (*b*) *Via* G.N. and G.C. routes. (*c*) *Via* Tonbridge and *via* Lewes. (*d*) *Via* L.S.W. & L.B.S.C. routes in 1918; *via* Guildford only from 1938 to 1941. (*e*) *Via* G.N. and G.E. routes. * By streamline train. † By streamline train between Edinburgh and London.

XUM

This, of course, takes no account of special buffet services, manned by outside organisations, for the benefit of Servicemen.

Railway Rebates for Government Traffic

A schedule of railway rebates for the carriage of Government traffic has been arranged in which rebates of charges will vary according to the category of traffic carried. The schedule provides for rebates beginning at 10 per cent. on the lowest rated commodities, and rising to 20 per cent. in the case of the highest categories. Hitherto the practice has been for every Government Department to receive treatment similar to that which would be accorded to a large commercial undertaking—that is to say traffic has been carried on the basis of agreed charges. The new method is expected to effect considerable economy of time as a result of adherence to an agreed schedule of rebates.

Tank Production in U.S.A. Locomotive Works

On April 24 the Baldwin Locomotive Works, Eddystone, Pennsylvania, completed the first of its orders for 28-ton medium tanks, many months ahead of time. The American Locomotive Works, Schenectady, had reached a similar stage a week earlier, eight months ahead of contract date.

Cheaper U.S.A. Rail Fares for Servicemen

Special railway fares of 1¼ cents a mile for the uniformed personnel of the Army, Navy, Marine Corps, and Coast Guard were established on May 1. These fares are available for round-trip travel in coaches between all points in the United States and are issued to any member of the U.S.A. Forces travelling in uniform on furlough at his own expense. The special fares have a 30-day limit and expire on October 31, 1941; consideration will be given to the possibility of extending the date. Tickets may be purchased upon presentation of an official furlough-fare certificate which can be obtained from the commanding officers at all military establishments.

Extensive U.S.A. Troop Movements by Rail

More troops and members of the Civilian Conservation Corps were moved by the U.S.A. railways in March than during any other month since the national defence programme began. During that month 327,188 were transported by rail to all parts of the country, an increase of 120,110 over January of this year and 94,450 more than in February. In addition to the 133,841 selectees taken from induction stations to reception centres on regular train services during March, the railways carried 193,347 soldiers, sailors, marines, and Civilian Conservation Corps men in regular and special trains. Approximately 180,000 of these were handled in 619 special trains, all but 56 of which were required by the Army alone. The largest task was the transport by rail of a division of about 12,000 men a distance of more than 1,000 miles—the longest movement of an entire division since the emergency started. All the movements during March were accomplished without interference to commercial traffic.

Reduced German Train Services

According to a press message dated May 21, 21 important German express trains, half of them with sleeping cars, have been withdrawn from the Reichsbahn timetable, partly owing to shortage of rolling stock and partly for reasons of economy in the use of coal.

Without giving reasons, the *Krakauer Zeitung* has announced that the passenger service on railways in German-occupied Poland has almost entirely ceased, except on express trains between Poland and Germany.

Railways in Germany

A review of economic conditions in Germany recently produced by the United States Department of Commerce states that in Luxembourg and Lorraine the output of steel is increasing, as much of the damage to steelworks caused by the German offensive in the spring of 1940 has been repaired. There is said to be a heavy demand for steel in Belgium on the part of rolling stock manufacturers. and many German firms are also said to be placing large orders for steel in Belgium with a view to benefiting by more prompt deliveries than can be obtained elsewhere.

The Todt organisation, which was formed originally to build the *Reichautobahnen* and has since developed into a Government agency for the construction of defence works, divided its attention in the latter part of 1940 between the construction of fortifications along the English Channel and the Atlantic coast, and reconstruction work in the German-occupied areas of Western Europe. In the latter sphere the main attention was devoted to the repair of bridges and railways that had been destroyed or damaged during the German invasion of the Low Countries and France.

Slovak Rail Service Restrictions

The Slovak Government has imposed further restrictions on railway traffic throughout the country, according to a press message dated April 28.

Balkan Rail Conference

A press message from Istanbul states that a conference of Turkish, German, and Bulgarian railway delegates is to be held on the Turkish-Bulgarian frontier to discuss the resumption of Turkish rail traffic with Bulgaria and Central Europe, which has been suspended completely since the German invasion of Greece.

Trans-Siberian Railway War Changes

As a result of the war in Europe, the Trans-Siberian Railway is reported to be issuing through tickets from Japan to only four European countries, namely, Soviet Russia, Germany, Sweden, and Italy. The new regulations came into force on March 1, and were the direct result of changes made by the Russian authorities, who have reduced the number of their stations for handling international railway passengers from 11 to three, namely, Moscow, Leningrad, and Halikov. Under the new regulations, no through tickets are permitted to be issued to the three Baltic states, Poland, Czecho-Slovakia, Finland, or the Netherlands.

Swiss Mountain Railways in Wartime

Local authorities have petitioned the Swiss Federal Government to incorporate some 400 km. (approximately 250 miles) of mountain railways in the Canton of Graubunden into the Swiss Federal Railways system owing to the fact that these railways have become a heavy charge on the Canton since the decline in foreign tourist trade due to the war. About 95 per cent. of these railways are privately owned, but financial contributions by the Canton and its communes in the form of direct subventions, purchases of stocks, loans, interest payments, and so forth, total fr. 140,000,000, corresponding to fr. 1,100 *per capita* of its population.

Railway Properties at Narvik

During the military operations in Northern Norway in May and June of last year, the property at Narvik of the Luossavaara-Kiirunavaara A/B (a subsidiary of Trafil A/B Grängesberg-Oxelösund) was heavily damaged and, according to an American report, no ore has been shipped through the port since that time. A preliminary estimate has placed the value of this damage at 12,000,000 kroner; the company's property at Narvik was shown in the accounts at 28,000,000 kroner before the outbreak of war.

Gauge Conversion in Norway

Efforts are being made to hasten the reconstruction of the Rorosbanen of the Norwegian State Railways from 3 ft. 6 in. to standard gauge in order that the whole 163 miles from Koppang to Stören, where it joins the main Dovre line to Trondheim, may be open to standard-gauge traffic before the summer, according to *Nationen and Tidens Tegn*. The authorities are endeavouring to provide the necessary material in order that work may be begun immediately. Reconstruction includes the strengthening of 70 bridges between Storen and Tynset, and in addition about 160,000 new sleepers have to be laid. The strengthening of the large bridges will be undertaken by contractors, but the smaller bridges will be dealt with by the railway administration direct. Presumably the Hamar-Elverum-Koppang section, 153 miles, has already been or is being converted to standard gauge. The Rorosbanen formed part of the main route between Oslo and

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Trondheim before the completion of the more direct standard-gauge Dovre line between Hamar and Stören in 1921. The section between Stören and Trondheim was converted from 3 ft. 6 in. to standard gauge in connection with the opening of the Dovre line.

Swedish Railways in War Conditions

Incidents multiply to show that, so far from the electrification of railways having proved a danger in wartime, it is an advantage to those countries which have undertaken it, mainly because the source of power for transport has thus been made independent of imported fuel. For example, the acute shortage of coal and oil in Sweden at the present time might have had a very much more adverse effect upon transport in the country than it has in fact. Most of the important Swedish main lines are electrified, and figures recently issued show that about 90 per cent. of all goods and passenger traffic on the Swedish State Railways is electrically-hauled, the policy in Sweden having been to electrify the main lines, and leave the secondary lines unconverted in the meantime. About 3,800 km. of the total route mileage of 9,700 km. of the State Railways is electrified, and of the 7,000 km. of the private lines about one-tenth is electrically operated. The scarcity of imported fuel in Sweden has necessitated drastic restrictions on its use, and the railways are forced to resort largely to wood fuel, with which locomotive power cannot be maintained to the same degree as with coal. For branch lines and secondary services railbuses are largely used by the Swedish State Railways, and these now mostly derive their power from producer gas.

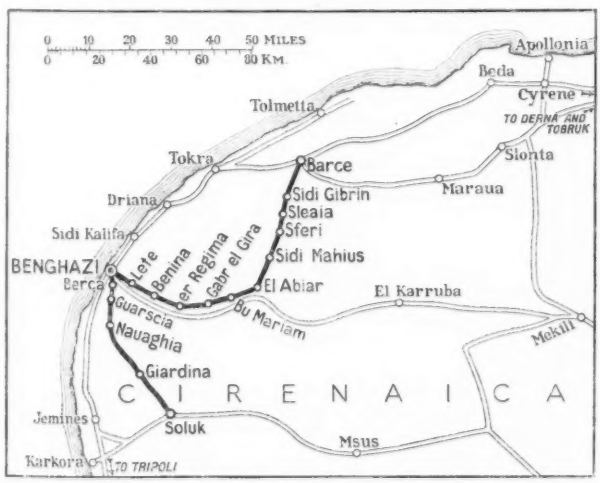
Jugoslavia

Although a considerable amount of resistance to the Germans is stated to be offered still in various parts of the country, the military occupation of Jugoslavia was virtually complete by April 19, and partition at once began.

The Hungarian seizures of Jugoslav territory on April 11 (Good Friday) are understood to comprise the regions known as the Banat of Batchka and Baranya, including the towns of Subotica and Novi Sad. This area is bounded by the Rivers Danube and Tisza and (on the north) by the former Hungarian frontier.

Italy is said to have claimed the Dalmatian coast and hopes to obtain Montenegro; Bulgaria is occupying Serbian Macedonia; and the parts of Slovenia around Maribor (Marburg) bordering on Austria are being held by Germany.

The Jugoslav province of Croatia was proclaimed a kingdom at Zagreb, its capital, on May 15. The agreement between Croatia and Germany (recorded at page 558 of our May 16 issue) is said to have defined the frontier between the two States as along the line of the old border between Croatia and the former Austro-Hungarian provinces of Carinthia and Styria. Precise demarcation is to take place in the near future. On May 18 King Victor Emmanuel of Italy selected his cousin, the Duke of Spoleto, to be King of this puppet Axis State of Croatia. The Duchess was Princess Irene, sister of King George of Greece.



The railways in the neighbourhood of Benghazi, built to the Italian colonial gauge of 0·95 metres (3 ft. 1⅜ in.) They were captured by the British Imperial Forces on February 7, but evacuated on April 3 and then occupied by the Germans

A.R.P. in Istanbul

Further instructions for the defence of Istanbul have been received there from the Turkish Government in Ankara. In the event of air raids, the inhabitants are instructed not to leave their houses or shelters. Trenches are to be dug in all gardens by contract labour. A.R.P. exercises are being carried out in the city and the suburbs. The intended use of the Istanbul underground railway as an air raid shelter was recorded at page 484 of our April 25 issue.

Basra Railway Extension

According to a report from the American Consulate-General in Baghdad, the sum of 45,000 Iraqi dinars has been appropriated for the extension of the railway line from Shuaibah, near Basra, to Zubair. The construction of the line itself, which cost 27,250 dinars, is reported to be completed, but stations, buildings, etc., remain to be finished. Presumably the railway is of metre gauge, as it is an extension of a short branch from the metre-gauge main line between Basra and Baghdad.

French African Air Transport Company

A new French company, known as Reseaux Aeriens Français, is said to have been formed in French (Vichy) Africa to take over the services of Regie Air Afrique and Aero Maritime.

European Air Lines

The thrice-weekly air line between Oslo and Stockholm, which has been operated since March by the Deutsche Luft Hansa A.G., was suspended on May 13.

New air line timetables introduced by the U.S.S.R. on May 5 provide for more than 60 passenger departures daily from Moscow. Since April 1 the Moscow-Berlin daily service, maintained jointly by Aeroflot and the Deutsche Luft Hansa, has completed the journey in one day. During the winter months an over-night stop has been included in the schedule.

Dutch Air Lines and the War

The K.L.M., or Royal Dutch Air Lines Company (Koninklijke Luchtvaart Maatschappij) continued to maintain various European air lines after the outbreak of war in September, 1939, up to the date of the German invasion of the Low Countries, May 10, 1940. Among the services operated was a daily one between Amsterdam and Berlin; from two to four flights each way between Amsterdam and Shoreham airport; and, up to the time of the invasion of Norway and Denmark on April 9, 1940, regular daily services to the Scandinavian countries and Finland. All operations in Europe ceased on May 10 of last year. A small number of aircraft was destroyed or damaged by German parachute troops and Dutch quislings, and those which could be moved were flown to England. Outside Europe the line to the Dutch East Indies was operated from Naples in the early war days, all aircraft on that route being then beyond the reach of the enemy. After the invasion and entry of Italy into the war, this service was worked only between Lydda (Palestine) and Batavia, from June 12.

In the Dutch East Indies a separate company, the K.N.I.L.M., or Royal Netherlands Indies Air Lines Company (N.V. Koninklijke Nederlandsche-Indische Luchtvaart Maatschappij) since 1928 has maintained inter-island air lines in the Dutch Indies archipelago, and recently a service between Java and Australia. After the occupation of Holland, the two companies combined their resources and together they now operate an increased service in the East Indies and on the Batavia-Lydda and Batavia-Sydney lines. The Batavia-Lydda line is flown by Dutch machines, and the Australia

line by planes of the colonial company. Of four services daily each way between the two principal island centres, Batavia (Java) and Medan (Sumatra), the Dutch company runs one and the colonial company three. The inter-urban services in Java have been increased, and a new feature is a night service between Batavia and Soerabaya throughout the length of Java. Traffic on all routes has increased appreciably, and the K.N.I.L.M. has now opened its own office in Sydney since the Australian route has grown in importance. The Lydda-Batavia journey now takes five days, and the Lydda-Sydney seven days. The growing air line activities in the Dutch East Indies may be seen by the increasing inter-island traffic figures as follow :—

	1939	1940
Number of passengers	21,000	27,000
Passenger kilometres	6¼ million	10¼ million
Plane-kilometres	1½ million	2 million

The aircraft kilometres for the year 1941 are estimated to total 3½ million.

Far Eastern Air Services

The *California Clipper*, of Pan-American Airways Inc., opened a new fortnightly air line between San Francisco and Singapore on May 8; it arrived at Singapore on May 10. This is an extension of the San Francisco to Hong Kong, *via* Manila, service.

Tasman Empire Airways, an associate company of the British Overseas Airways Corporation, opened its route between Sydney (New South Wales) and Auckland (New Zealand) on April 30, 1940. In the first year of working it has conveyed 1,500 passengers and 75,000 lb. of mail.

Due to the situation in Iraq, the Empire air mail service has been temporarily and partly suspended between Australia and the United Kingdom, and between Australia and South Africa (the horse-shoe route), as from May 6.

Alternative Route for British Air Mail

The Postmaster General announced on May 21 that air mail correspondence for Burma, Ceylon, Dutch East Indies, India, Malaya, and Thailand (Siam) may now be sent by air throughout *via* the U.S.A. as an alternative to the existing route, which is by sea as far as South Africa. The rate of postage for correspondence sent *via* the U.S.A. is 5s. per ½ oz. (postcards 2s. 6d.). The service *via* the U.S.A. by air throughout was previously available for correspondence for Australia, New Zealand, and the Philippine Islands (letters 4s. 6d. per ½ oz., postcards 2s. 3d.) and Hong Kong and Macao (letters 5s. per ½ oz., postcards 2s. 6d.).

L.N.E.R. Monthly Suburban Timetables

Train alterations called for by the swiftly changing conditions of wartime railway operation sometimes render suburban timetables out of date a comparatively short time after they have been issued and some public inconvenience is caused. As an experiment the L.N.E.R. has therefore decided to issue its new London suburban timetables on the first Monday in every month, and the first under this new arrangement will be dated June 3, covering lines radiating from Liverpool Street and Fenchurch Street (2d.); lines radiating from King's Cross (2d.); and the Marylebone and High Wycombe line, joint with G.W.R. (1d.). Services on the Marylebone and Aylesbury line, joint with London Transport, will continue to be covered in a joint timetable issued from time to time.

The German State Railway in 1940

The preliminary annual report of the Deutsche Reichsbahn (German State Railway) for 1940, a summary of which has reached us *via* the U.S.A., gives a short survey of developments during the past year, but contains very few figures, a reflection of the influence of war on the German transport system. The report stresses the gigantic task accomplished by the Reichsbahn in handling the heavy traffic at the beginning of the year, resulting from the long suspension of inland waterway transport during the severe winter of 1939-40; the increasing freight traffic from eastern and south-eastern Europe (a blockade-caused diversion of foreign-trade channels); the heavy coal shipments to Italy, reported to approximate 1,000,000 metric tons a month; the extensive railway shipments in connection with the economic "penetration" of the newly-incorporated territories; and the heavy demand on railway facilities by the German armed forces. Unprecedented transport peaks were encountered in connection with the Netherlands, Belgian, and French campaigns; the conveyance of enormous quantities of military equipment from these countries to Germany; and the movement of troops after the termination of the French campaign.

Receipts of the Reichsbahn in 1940 are estimated at RM. 7,600,000,000 against RM. 5,800,000,000 in 1939, an increase of about 31 per cent. The two figures are not strictly comparable as the 1940 returns include the revenues from the railway lines in the new eastern territories; of the districts of Eupen, Malmedy, and Moresnet (Belgium); the revenues from a number of recently-nationalised private railways in Germany; and the revenues from the Reichsbahn-operated lines in Luxembourg, Alsace, and Lorraine. The 1940 figures reflect the effect of the cancellation of almost all fare reductions which became effective January 15, 1940, and it must also be remembered that all transport handled on behalf of the German armed forces was charged at greatly reduced rates. Without giving data, the Reichsbahn report mentions "substantial increases" in expenditure over the preceding year, notably in connection with the repair of war damage in Alsace and Lorraine. Also without giving data, the report states that receipts covered all expenditures, including the Statutory contribution (*Abgabe*) to State funds (*Reichskasse*), amortisation and interest service, and transfers to reserve. The contribution made to State funds from transport revenues, as well as the transport tax (*Beförderungssteuer*) paid, were considerably higher than in 1939, due to the increased volume of business.

Few details of assets and liabilities are given. Capital requirements were substantially higher than in 1939, mainly as a consequence of the redemption of outstanding Work Procurement Bills (*Arbeitsbeschaffungswechsel*) totalling some RM. 300,000,000. The financing of capital requirements including extension of lines, augmentation of real property and rolling stock, and debt redemption, has been effected through loans and from liquid capital of the Reichsbahn. In connection with the general conversion of bonds and the reduction in interest rates, the Reichsbahn converted the 7 per cent. preferred stock (*Reichsbahn-Vorzugsaktien*) outstanding at July 1, 1940. At the same time a 4 per cent. 1940 loan totalling RM. 1,500,000,000 was offered for subscription and is stated to have been absorbed by the market immediately. The new loan was used for the conversion of the preferred stock carried over from the time when the Reichsbahn was still a joint stock company. The original issue of preferred 7 per cent. stock amounted to RM. 1,081,000,000, almost the entire amount of which has now been converted. As heretofore, the liquid funds and bank transactions of the Reichsbahn have been administered by its own bank, the Deutsche Verkehrs-Kredit-Bank A.G.

According to the report, the relation of indebtedness to assets of the Reichsbahn continues favourable. Including the new loan and a number of smaller credits, and after the amortisation of the preferred stock and of other liabilities falling due, the long-term indebtedness of the Reichsbahn is stated to amount to about RM. 4,000,000,000. This amount does not include a sum of approximately RM. 400,000,000 from the 1936 Reichsbahn Loan which was transferred to the German National Motor Roads. On the other hand, the value of real property and rolling stock at the beginning of 1940 amounted to almost RM. 39,000,000,000 and the capital of the Reichsbahn to about RM. 20,000,000,000. It is said that the total value of real property and rolling stock of the Reichsbahn will be further increased by the value of the railways taken over in the "western territories."

Questions in Parliament

Troops Free Warrants

Captain T. L. Dugdale (Richmond York—C.), on May 20, asked the Secretary of State for War whether, in view of the number of serving soldiers whose homes were being destroyed in air raids, he would consider permitting commanding officers to increase the number of free railway warrants that they were allowed to issue to troops proceeding on compassionate leave.

Captain H. D. Margesson (Secretary of State for War) replied that commanding officers already had authority to issue free warrants to all soldiers and officers below field rank who were granted compassionate leave for the purpose of visiting their homes when these had been seriously damaged or relatives had been seriously injured as a result of enemy action. These free warrants were additional to the normal entitlement of two free leave warrants a year.

Parliamentary Notes

Progress of Railway Bills

The London Midland & Scottish Railway Bill was reported, with amendments, to the House of Commons on May 20, from the Committee on Unopposed Bills (with Report on the Bill). The Bill, as amended, and the report were ordered to lie upon the table, and the report was ordered to be printed.

The Lords' amendments to the Southern Railway (Superannuation Fund) Bill were considered in the House of Commons on May 21 and the Lords' amendments were agreed to.

The Railway Clearing System Superannuation Fund Corporation Bill was read a third time, and passed in the House of Commons on May 21.

The Great Western Railway (Variation of Directors' Qualification) Bill was reported, without amendment, to the House of Lords on May 21.

The Railway Clearing System Superannuation Fund Corporation Bill was read a first time in the House of Lords on May 21 and referred to the examiners.

The Southern Railway (Superannuation Fund) Bill was returned to the House of Lords from the Commons on May 21 with amendments. These were considered and agreed to.

The Great Western Railway (Superannuation Fund) Bill and the Southern Railway (Superannuation Fund) Bill received the Royal Assent in the House of Lords on May 22.

CANADIAN PACIFIC RAILWAY COMPANY.—The company has notified holders of its twenty-year 4½ per cent. sinking fund secured note certificates, 1944, that the whole of the outstanding certificates will be redeemed on June 15 next at 100½ per cent., with accrued interest. The outstanding amount of the certificates is $18,473,100.

Staff & Labour Matters

R.C.A. Conference

The annual conference of the Railway Clerks' Association was held at Blackpool this year from May 19 to 21. In his presidential address Mr. F. C. Watkins, J.P., M.P., advocated public ownership and control of rail and road transport. "It is the only way," he said, "in which the industry can be effectively harnessed in the present critical situation to the national effort for victory. There ought not to be four group companies. We need a single instrument of railway organisation in place of an arrangement in which four groups work together as though they were united through the medium of a railway executive committee." Transport today was a vital service, he added. It was essential that the docks should be cleared quickly. For that purpose transport as a whole should be transformed into a single unified organisation publicly owned.

Wages were discussed at the opening session, and a resolution, urging that the Trades Union Congress should reach general agreement with the Government regarding wage increases in all industries and suggesting automatic increases based on the cost of living, was defeated.

The conference carried a resolution that women replacing men on railways and women already performing the duties of men, should receive the rate of pay for the job.

FORMOSA—SERIOUS HEAD-ON COLLISION.—Recently an express from Keelung and a goods train from Takao came into head-on collision at Kyujo station, about three miles from Takao. As a result, more than 200 persons are believed to have been either killed or injured. The accident is thought to have been due to an error made by a signalman.

L.N.E.R. SUBURBAN TRAIN SERVICE IMPROVEMENTS.—With the introduction by the L.N.E.R. on June 3 of new London suburban timetables, a number of improvements in train service will come into operation. Some of the Saturday business services between King's Cross and the New Barnet line will be accelerated by the omission of certain stops. The morning trains from the Gordon Hill line between 8.20 and 9.20 a.m. will be re-arranged to provide a service at 15 min. intervals. Some of the business hour services on Saturday will be accelerated by the omission of certain stops. A new train will run from Finsbury Park at 6 p.m. to Welwyn Garden City and Hitchin. The 6.30 p.m. from King's Cross will be re-timed to leave at 6.45 and extended to Welwyn Garden City. A through train from King's Cross for the Luton and Dunstable line will run on Saturdays at 12.10 p.m. From Marylebone a new train will leave at 7 p.m. to Denham and all stations to High Wycombe. The 6.40 p.m. from Marylebone will leave at 6.35 and provide Beaconsfield and High Wycombe with a faster service by the omission of certain stops. The 4.50 p.m. Marylebone to Brackley will be replaced by the 6.20 p.m. which will be extended to Brackley, arriving there at 8.22 p.m.

RAILWAY BENEVOLENT INSTITUTION.—The eighty-third annual meeting of members will be held in Committee Room "C," London Midland & Scottish Railway Company, Euston Station, London, N.W.1, on Monday, June 30, at 4 p.m., to receive the report of the board of management, admit to school benefits one child in the officers' department, and to transact the ordinary business of the institution. The board will appoint to contingent annuities 86 widows and six members in the officers' department and 1,023 widows and 304 members in the servants' department.

RAILWAL MATERIALS FOR SPAIN.—The Government has appointed a Railway Materials Commission, with Senor R. R. y Martinez Corera, Commander of Engineers, as its Chairman. It is charged with the organisation and carrying out of all repair works, reconstruction, and building of rolling stock and other equipment. The commission will control the distribution of all raw and finished materials required by the railways, now nationalised, and will decide priority of supply. It may also modify the scheduling of work in railway shops and order double or treble working shifts in workshops producing materials for the National Railways.

SINGLING THE CEYLON MAIN LINE.—The Polgahawela-Rambukkana section of the Government Railway main line, in which falls the Rambukkana Oya bridge, severely damaged during the floods in May, 1940 [as described and illustrated on page 453 in our issue of April 18 last—ED., *R.G.*] is proving a problem for the engineers. In the first place it seems practically impossible to obtain a new 100-ft. through span to replace the one so seriously damaged, and single-line working at the bridge, therefore, seems imperative for a long while to come. The question to be settled is whether the whole section between the stations named above shall be converted permanently to single line, or whether local single-line working only over the bridge shall be retained.

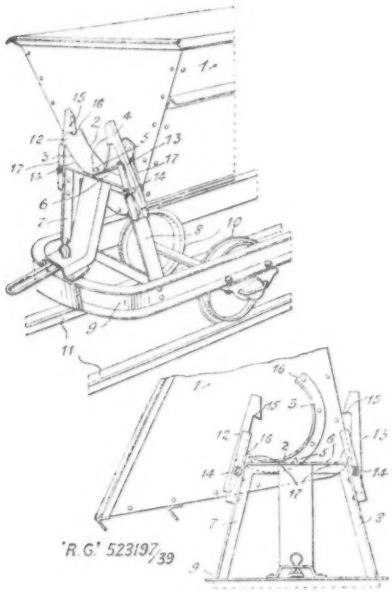
The latter alternative would entail costly river protection works, whereas single line throughout the section will permit of an improved alignment near the 48th mile and the recovery of five miles of track and some bridge spans for use elsewhere. A recommendation to convert the whole section to single line is, therefore, being considered by the Executive Committee of Communications & Works.

ABSTRACTS OF RECENT PATENTS*

523,197. Tipping Wagons

W. G. Allen & Sons (Tipton) Limited, and Rowland Butler, all of Princes End, Tipton, Staffordshire. (*Application date: February* 5, 1939.)

A tipping wagon has wheels 10 running on rails 11, the axles being mounted in an under-frame 9. Mem-

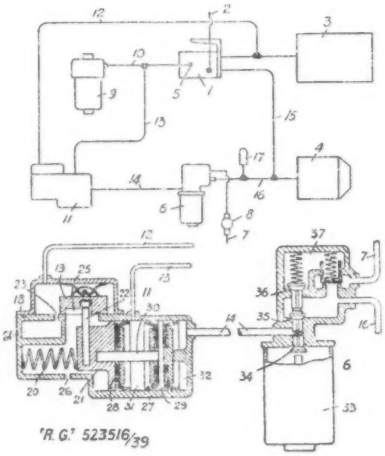


bers 7 and 8, supported on the under-frame, are formed from a top member 6 which carries a peg 5. This peg is for centralising the trunnion 2 when in the normal upright position, by engaging a hole 4 in the arcuate portion 3 of the trunnion. A trunnion 2 is securely fixed at each end of the body 1. Lever catches 12 and 13 are arranged on the members 7 and 8, and are fulcrummed at 14. When the body 1 and trunnion 2 are in the normal upright position, hooks 15 on the catches 12 and 13 engage the ends of the trunnion 2 in self-locking manner. The fulcrum pins 14 pass through side walls of a trunnion guide 17 secured to the members 7 and 8, the levers 12 and 13 working in the channel section of this guide 17. In order to tip the body 1 to one side it is necessary to press the lever catch 12 or 13 on the opposite side.—(*Accepted July* 8, 1940.)

No. 523,516. Brakes

Westinghouse Brake & Signal Co. Ltd., Arthur Greenwood Kershaw, and Arthur William Simmons, all of 82, *York Way, King's Cross, London, N.*1. (*Application date: January* 10, 1939.)

Electro-pneumatic fluid pressure braking apparatus of the kind comprising the usual auxiliary reservoir 3 and triple or other form of distributing valve device 1 controlling the supply of fluid under pressure to and its release from the brake cylinder 4 in response to variations in pressure in an automatic brake pipe communicating with the valve 1 through a pipe 2, is provided with an auxiliary control valve 11 which is arranged to vent a fluid-containing bulb or chamber 24 to atmo-

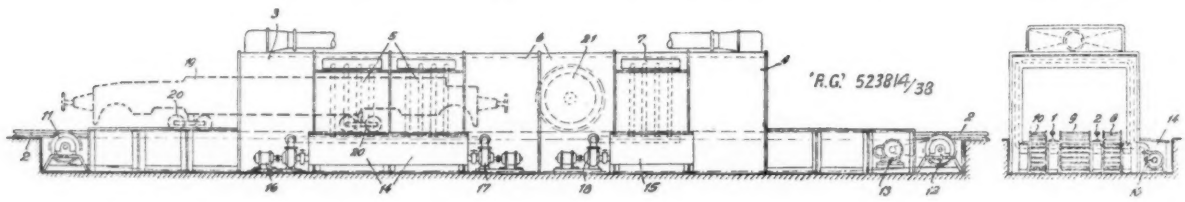


sphere when an electric application of brakes is effected and to establish communication between the bulb 24 and the auxiliary reservoir 3 subsequent to electric application or prior to electric release of the brakes. It is ensured that the valve 1 shall be restored automatically to its full release position if displaced therefrom prior to or during electric application of brakes. The apparatus also includes an electromagnetically actuated application valve 6 controlling fluid supply to cylinder 4 from pipe 7 leading to the main reservoir through a reducing valve 8. An electromagnetically actuated holding valve 9 communicates with the exhaust port 5 of valve 1 through a pipe 10. The valve 11 communicates through pipes 12, 13 with reservoir 3 and pipe 10, respectively, and through pipe 14 with the valve 6. Pipes 15 and 16 communicate valve 1 and cylinder 4, and cylinder 4 and valve 6, respectively, a safety valve 17 being provided. The auxiliary control valve 11 consists of a casing 18 with a slide valve 19 normally held as shown by a spring 20 which presses on a slider 21 coupled to valve 19 by a rod 22. Normally port 23 is uncovered to permit communication between pipe 12 and bulb 24, but when moved to the left the valve 19 permits communication between bulb 24 and the atmosphere through ports 23 and 26, and a cavity 25 in the valve 19. The slider 21 moves in a cylinder 27 and is secured to an inner piston 28. An outer piston 29 has a stem 30 which fits loosely within a recess in slider 21. Pipe 13 communicates with space 31 between the pistons 28, 29, and pipe 14 communicates with space 32 behind the piston 29. The application valve 6 comprises an electromagnet 33 which, when energised, closes a normally open poppet valve 34 and opens normally closed poppet valves 35, 36. The valves 34, 35, 36, when open, establish communication between pipe 14 and atmosphere, pipes 14 and 16, and pipes 7 and 16 by way of chamber 37, respectively.—(*Accepted July* 16, 1940.)

No. 523,814. Washing Rolling Stock

Eduard Haas, of Gotha Am Seeberg 1, *Germany.* (*Convention date: January* 14, 1938.)

Washing apparatus, particularly for locomotives frames, is built over the rails 1, 2, and consists of steam hood compartments 5, neutral compartments 6 and a swilling compartment 7. In the washing apparatus there are three feeding bands 8, 9, 10, running over drums 11, 12 driven by a motor 13; these bands are used to carry small parts. Towing means may be provided on the bands for pulling a vehicle along with its accessory small parts on the said bands. The washing and swilling fluid containers 14, 15 are arranged in a pit, beside the bands and below the level of the rails 1, 2. Pumps 16, 17 lead washing fluid from container 14 to a nozzle system in the



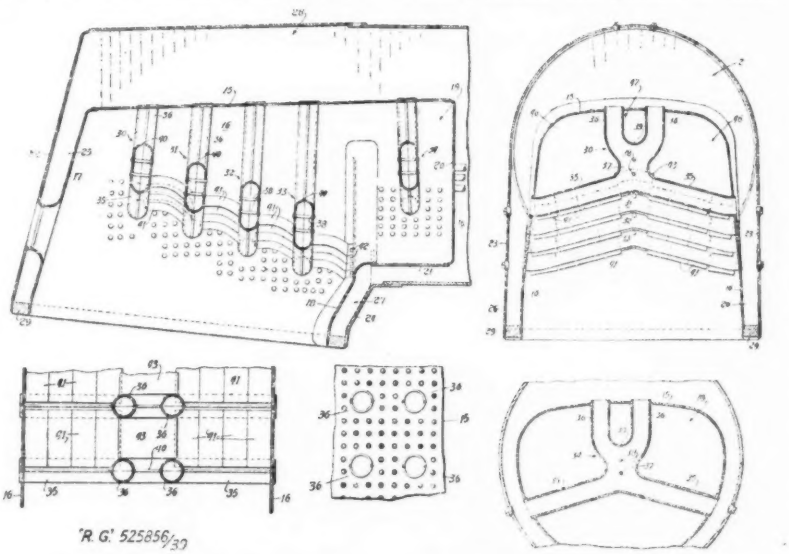
* These abridgments of recently published specifications are specially compiled for THE RAILWAY GAZETTE by permission of the Controller of His Majesty's Stationery Office. Group abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet as issued, on payment of a subscription of 5s. a group volume, or in bound volumes, price 2s. each, and the full specifications can be obtained from the same address price 1s. each.

washing apparatus. Similarly, a pump 18 feeds swilling fluid to a nozzle system in the swilling room 7. In washing a locomotive frame 19, the frame is run on mounting wheels 20, and wheel sets 21 may be washed by the same procedure.—(*Accepted July* 23, 1940.)

No. 525,856. Fireboxes

*Geoffrey Gordon Barker, B.Sc., of Furnival House, 14–18, High Holborn, London, W.C.*1. (*A communication from Locomotive Firebox Company, of* 310, *South Michigan Avenue, Chicago, Illinois, United States of America.*) (*Application date: March* 2, 1939.)

A firebox includes crown sheet 15, inner side sheets 16, inner back sheet 17, and inner throat sheet 18, combustion chamber 19 closed at the front by flue sheet 20, the bottom 21 merging into sheet 18, outer rear boiler sheet 22, outer side sheets 23, and outer throat sheet 24, back water leg 25, side water legs 26 and front throat 27, in communication with the water space 28 of the boiler, and a mud ring 29. Now, elements 30, 31, 32, 33 and 34 are provided, each having a lower portion with downwardly extending inlet legs 35 opening through the side sheets, and spaced apart upper portions, having upwardly extending outlet legs 36, which connect the lower portion with the boiler water space above the crown sheet. The legs 35, 36 connect at a mid portion 37 which may be stay-bolted at 38, the tog 39 of this mid-portion being a crotch between the outlet legs 36. Each element is preferably made from two counter parts



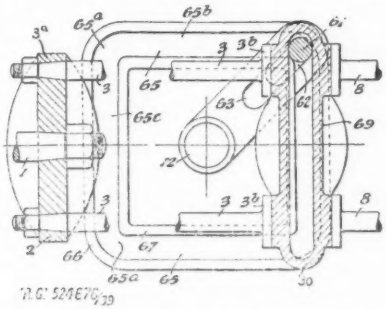
'R. G.' 525856/39

welded together as at 40. When a firebox arch is desired side bricks 41 are laid in series upon the legs 35. Lugs 42 on the inner throat sheet 18 support the front ends of the first series of brick at the firebox front. A central key brick 43 has wedge-like engagement at the sides in the space between the innermost end bricks. Together with the arch the elements divide the upper portion of the firebox into three passages 46, 46, and 47.—(*Accepted September* 5, 1940.)

No. 524,676. Locomotive Driving Gear

Timothy Taylor, of c/o Vaal-Hartz Irrigation Works, P.O. Andalusia, Transvaal, South Africa. (*Application date: February* 3, 1939.)

A crosshead drive, particularly for locomotives, comprises a crosshead 69, a crank pin 61 engaging therewith and



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mounted on a crank block 62 which is free to slide in a slot 63 in a member (such as the crank web or wheel to be driven) rotatable about a pivot or axle 12 so as to be movable radially thereto and engaging on opposite sides with the walls of a slot extending transversely across the crosshead 69, and an endless crank pin guide groove 65, formed by the frames 66 and 67 and of substantially square configuration having portion 65*b* parallel to cross-head movement and transverse joining portions 65*c* in which the pin moves at the end of each stroke. Curved sections 65*a* join the sections 65*b* and 65*c*. The piston rod 1 has a flange head 2 which receives slide rods 3, these rods also being secured to a crosshead member 30 adapted to have driving engagement with crank pin 61. Tapering of the ends 3*a* of the rods 3 allows these rods to be bolted to the flange 2, and flanges 3*b* at the other ends receive studs threaded into one side of the crosshead member 30. Rods 8, similar to the rods 3, are arranged on the opposite side of the crosshead member 30. In a modification the guide groove 65 is mainly elliptical.—(*Accepted August* 12, 1940.)

COMPLETE SPECIFICATIONS ACCEPTED

523,242. Link, Jun., E. A. Signal-actuating mechanism.

523,516. Westinghouse Brake & Signal Co. Ltd., Kershaw, A. G., and Simmons, A. W. Electro-pneumatic braking apparatus.

523,531. Fishburn, J. E., and Webb, C. F. Machines for printing and issuing tickets, receipts, vouchers, and the like.

523,592. Maley, A. W., and Taunton, E. M. Regenerative braking on electrically-driven vehicles.

523,623. Brecknell, Munro & Rogers (1928) Limited, and Dolman, H. J. Devices for delivering coins from a bulk supply.

523,718. Westinghouse Brake & Signal Co. Ltd., Barty, T., and Burrows, F. A. Steam-heated radiators.

523,762. Westinghouse Brake & Signal Co. Ltd., and Venning, C. F. D. Point and signal control systems for railways and the like.

523,814. Haas, E. Washing apparatus for the cleaning of goods running on rails.

523,835. Vereinigte Eisenbahn-Signal-Werke Ges. Railway signalling systems

523,940. Westinghouse Brake & Signal Co. Ltd. Railway traffic controlling apparatus.

524,052. Babcock & Wilcox Limited. Water-tube boilers with superheaters.

524,091. Cockburns Limited, Grant, T., and Rodger, J. Control apparatus for the manœuvring valves of steam engines.

524,223. Standard Telephones & Cables Limited, Brown, A., and Godfrey, L. J. Railway signal and/or points control systems.

524,236. General Railway Signal Company. Apparatus and circuits for the control of railway track switches.

524,357. General Railway Signal Company. Control systems for railway track switches and signals.

524,411. Summerson & Sons Limited, T., and Wrightson, S. S. Rail chairs and the like.

524,482. British Insulated Cables Limited, London Passenger Transport Board, Broom, T. C., and Powell, H. J. Overhead equipment of electric traction systems.

524,676. Taylor, T. Driving-gear for locomotives and other vehicles and engines.

525,008. Winbladh, K. H. Device for signalling the derailment of railway carriages.

525,066. Schweizerische Lokomotiv und Maschinenfabrik. Electric high-speed locomotives for great tractive efforts.

525,090. Patentverwertungs - Ges. Hermes. Odometers for railway carriages and like vehicles.

525,116. Budd International Corporation. Joint constructions for vehicle bodies.

525,139. Michelin & Cie. Means for suspension of rail vehicles.

525,553. Porsche, F. Sheet metal doors.

Notes and News

Compagnia Italiana Turismo (C.I.T. England) Limited.—A winding up Order, dated May 12, has been made by the High Court of Justice.

British Holding of New York Central Shares.—A New York message to Reuters says that an investment firm has bought 187,000 British-owned shares in the New York Central Railroad Company.

Canadian Pacific Railway.—The company announces that it will redeem on June 15, 1941, at 100½ plus accrued interest, the whole of its special land sales trust and sinking fund note certificates, dated December 15, 1924, of which $18,473,100 were outstanding at December 31, 1940. Funds have been supplied to the Royal Trust Company, trustee for this issue.

Canadian National Railways.—Gross earnings during April last were $24,648,899, an increase of $6,982,735, and operating expenses were $17,849,537, an advance of $1,872,354, leaving net earnings $5,110,381 higher, at $6,799,362. Aggregate gross earnings from January 1 are $89,347,366, an increase of $18,307,087, and the net earnings of $17,490,928 show an improvement of $10,363,986.

The Cúcuta Railway.—Proposals are being considered by the Government of Colombia for the acquisition of the Cúcuta Railway, and it is understood that the official commission that visited the railway has reported favourably. The Cúcuta Railway, now owned and operated by a private company, is 99½ km. (62 miles) in length, of metre gauge. Gross receipts in 1940 amounted to $309,543, and working expenses to $275,638. Passengers numbered 176,352 and 58,033 tons of goods were carried.

The Northern General Transport Co. Ltd.—Notice is given in *The London Gazette* that the Northern General Transport Co. Ltd. and Gordon Willis Hayter have offered to surrender the Letters Patent numbered 519,226, and bearing date October 1, 1938, granted them for an invention entitled "Improvements in or relating to centrifugal clutches." Any notice of opposition to the surrender should be lodged at the Patent Office, 25, Southampton Buildings, London, W.C.2, not later than June 21, 1941.

G.I.P. Railway Annuities.—In accordance with the provisions of the Great Indian Peninsula Railway Purchase Act, 1900, it is notified that on May 1, 1941, a total sum of £23,588,252 17s. 7d. was invested for the purpose of providing a sinking fund in respect of the Class "B" annuities.

Passenger Train Derailed in Chile.—A passenger train of the Chilean Longitudinal Railway from Calera to Antofagasta on March 8 became derailed on emerging from the Palos Quemados tunnel, one of the longest in Chile, and overturned. The point where the accident occurred is 3,000 ft. above sea level, with a precipice on one side. As the train was crowded with passengers it was fortunate that only nine persons were killed and 32 injured.

San Paulo Railway.—At the annual meeting on May 20 of the San Paulo (Brazilian) Railway Co. Ltd., Mr. O. R. H. Bury, Chairman, said that indications pointed to further increases in costs and taxes, and intensification of the depression in export trade. On the other hand, there was some hope of an improvement in local industry. Even so the local superintendent considered it would be optimistic to look for results as good as those disclosed for the year under review, and suggested that the difficulties of remittance on which the payment of dividends depended would be accentuated.

Argentine-Bolivian International Railway.—According to the *South American Journal*, the convention between Argentina and Bolivia for the construction of the Yacuiba to Santa Cruz railway, referred to in our Overseas Section of May 9 last, was signed in Buenos Aires on February 11, 1941. The Argentine Government is to provide the funds for the construction of the first section to Villa Montes. The amount involved may amount to 2,000,000 Argentine pesos, and the amounts advanced are to be amortised at 5 per cent. per annum, with interest at 3 per cent. This line will provide a second international connection between the two countries and will afford a direct route to Formosa on the river Paraguay. At the other end of the line Santa Cruz is an important junction on the proposed transcontinental railway described in THE RAILWAY GAZETTE of January 24, 1941.

Irish Traffic Returns

IRELAND		Totals for 19th Week			Totals to Date		
		1941	1940	Inc. or Dec.	1941	1940	Inc. or Dec.
		£	£	£	£	£	£
Belfast & C.D. (80 miles)	pass.			No returns to hand			
	goods						
	total						
Great Northern (543 miles)	pass.			No returns to hand			
	goods						
	total						
Great Southern (2,049 miles)	pass.	36,321	39,937	− 3,616	675,119	578,156	+ 96,963
	goods	50,999	41,440	+ 9,559	965,049	857,081	+ 107,968
	total	87,320	81,377	+ 5,943	1,640,168	1,435,237	+ 204,931
L.M.S.R. (N.C.C.) (247 miles)	pass.			No returns to hand			
	goods						
	total						

British and Irish Railway Stocks and Shares

Stocks	Highest 1940	Lowest 1940	Prices May 27, 1941	Prices Rise/Fall
G.W.R.				
Cons. Ord.	52	22½	33½	−½
5% Con. Pref. ...	103½	58	99½	+1
5% Red. Pref. (1950)	105½	88	103	—
4% Deb.	107½	90½	111½	+1
4½% Deb.	108½	96½	113	—
4½% Deb.	114½	96	116½	—
5% Deb.	124	106	130	—
2½% Deb.	66½	57	66	—
5% Rt. Charge ...	117½	97	127½	—
5% Cons. Guar. ...	117	90½	125½	—
L.M.S.R.				
Ord.	24⅞	9	12½	
4% Pref. (1923) ...	60½	21⅜	38½	—
4% Pref.	70½	35	57½	+1
5% Red. Pref. (1955)	94½	60	84½	—
4% Deb.	101½	81	102½	—
5% Red. Deb. (1952)	109½	102	108	—
4% Guar.	93½	65	95½	—
L.N.E.R.				
5% Pref. Ord. ...	8⅜	1½	2⅜	—
Def. Ord.	4⅜	1¼	1⅜	—
4% First Pref. ...	60	20	37½	—
4% Second Pref. ...	22⅞	6½	13	—
5% Red. Pref. (1955)	80	34½	62½	—
4% First Guar. ...	86½	56	84½	−1
4% Second Guar. ...	77½	37	70½	—
3% Deb.	73½	54½	75½	−½
4% Deb.	97⅜	74	100½	—
5% Red. Deb. (1947)	107	96½	104	—
4½% Sinking Fund Red. Deb.	104	98	102½	—
SOUTHERN				
Pref. Ord.	79	34	50½	—
Def. Ord.	22½	7	9½	½
5% Pref.	104½	58⅜	93½	—
5% Red. Pref. (1964)	105	85	100½	—
5% Guar. Pref. ...	116½	90	126	—
5% Red. Guar. Pref. (1957)	114 7/16	94	113½	—
4% Deb.	106½	84½	109½	—
5% Deb.	122½	100	128½	—
4% Red. Deb. (1962-67)	106	96½	106	—
4% Red. Deb. (1970-80)	106⅜	93	106	—
FORTH BRIDGE				
4% Deb.	95½	87	93½	—
4% Guar.	93½	81½	91½	—
L.P.T.B.				
4½% "A"	116	103	118½	−1
5% "A"	121½	107	126½	—
4½% "T.F.A." ...	105½	101	102½	—
5% "B"	116	102	112½	—
"C"	65½	24	31	—
MERSEY				
Ord.	26	18½	20½	—
4% Perp. Deb. ...	92½	86½	92½	—
3% Perp. Deb. ...	69	63	67½	—
3% Perp. Pref. ...	57	50½	53½	—
IRELAND				
BELFAST & C.D.				
Ord.	4	3	4	—
G. NORTHERN				
Ord.	4½	1½	6	—
G. SOUTHERN				
Ord.	12½	4	6¾	—
Pref.	15½	6	7	—
Guar.	36	15	27	+3
Deb.	55½	40	51½	+1½

OFFICIAL NOTICES

London & North Eastern Railway Company

NOTICE is hereby given that, for the purpose of preparing the warrants for Interest on the Company's 3 per cent. and 4 per cent. Debenture Stocks and 4½ per cent. Sinking Fund Debenture Stock for the half-year ending 30th June, 1941, the balances will be struck as at the close of business on 10th June, and Interest will be payable only to those Stockholders whose names are registered on that date.

Transfers of the above-mentioned Stocks should, therefore, be lodged with the Registrar of the Company at Hamilton Buildings, Liverpool Street Station, London, E.C.2, before 5.0 p.m. on 10th June.

By Order,
P. J. DOWSETT,
Secretary.

Marylebone Station,
London, N.W.1.
30th May, 1941.

Rio Tinto Company Limited

DIVIDEND ON SHARES TO BEARER

HOLDERS OF SHARE WARRANTS TO BEARER are informed that they will receive PAYMENT of the DIVIDEND declared at the General Meeting held on the 23rd inst., at the rate of 2s. 6d. per Share on the Preference Shares, less Income Tax, on and after Monday, the 9th June, 1941, on presentation of Coupon No. 88 on the Preference Shares at the Company's Office in London.

Coupons for payment must be left four clear days previously for examination, and may be deposited forthwith.

By Order,
J. DAVIDSON,
Secretary.

Offices of the Company:
11, Old Jewry, London, E.C.2.
23rd May, 1941.

Universal Directory of Railway Officials and Railway Year Book

46th Annual Edition, 1940-41

This unique publication gives the names of all the principal railway officers throughout the world together with essential particulars of the systems with which they are connected. Much general and statistical information about railways is also concisely presented.

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RAILWAY AND OTHER REPORTS

Antofagasta (Chili) & Bolivia Railway Co. Ltd.—After providing for loss on exchange income tax,, interest on debentures, and a contribution to the staff benevolent fund, net revenue is £212,500 (against £176,498) which it is proposed to carry forward.

Alabama Great Southern Railroad Company.—Gross operating revenue in 1940 was $8,225,000, an increase of $547,418. Freight revenue increased $449,322, or 6·81 per cent.; passenger traffic was up $78,292, or 13·60 per cent. In operating expenses and taxes there was an increase of $453,614, or 7·44 per cent. Net income was $2,338,528, against $2,111,051. Dividends are $9 on each $50 share.

New York, Ontario & Western Railway Company. — Operating revenue for 1940 was $5,466,414, against $6,014,156, and expenses were reduced from $5,519,524 to $5,296,846, leaving net revenue from railway operations $169,567, against $494,631. Taxes and equipment and joint facilitity rents took $886,343, and interest, etc., charges $1,367,921. Non-operating income was $18,953, and the net deficit amounted to $2,065,744.

New York, New Haven & Hartford Railroad Company.—The 1940 annual report shows railway operating revenues of $85,604,108, an increase of $2,185,633, and operating expenses ($62,199,236) were $740,076 higher, but the operating ratio was lowered from 73·68 per cent. to 72·66 per cent. Net revenue from operations improved by $1,445,557 to $23,404,873, and the net railway operating income of $9,274,354 was $811,432 higher. Total income was $11,944,357, but the total fixed charges of $13,321,086 caused a net deficit of £2,003,175, which was $910,940 less than that for 1939.

Chesapeake & Ohio Railway Company.—Net income in 1940, after interest and other charges, showed an increase of $6,248,550 over that for 1939. Railway operating revenues at $130,720,172 were $13,998,117 higher, and although the operating expenses of $74,088,008 were $5,228,387 up, the operating ratio was reduced from 58 per cent. to 55·82 per cent. Net railway operating income advanced by $4,463,607 to $40,817,745, and the total income of $42,063,200 was $5,058,143 higher. Net income amounted to $33,591,166, and the income balance transferred to profit and loss, after appropriations to sinking and other reserve funds, was $32,542,210.

Maidstone & District Motor Services Limited.—This subsidiary of Tilling & British Automobile Traction Limited and of the Southern Railway Company (jointly) reports that, after providing £118,319 (against £62,151) for tax and E.P.T., £73,916 (£96,260) for depreciation and £20,000 (same) for reserve, the directors propose to pay a final dividend of 5 per cent. and a bonus of 1¼ per cent. (making again a total of 11¼ per cent.) and to carry forward £34,195 (£34,456).

Central Wagon Co. Ltd.—The directors have declared an interim dividend of 3 per cent. (same) for the year to September 30 next.

The Butler Machine Tool Co. Ltd.—Warrants for the dividend on the 5 per cent. cumulative preference shares for the six months to June 30, 1941, less tax, will be posted on June 28.

Coventry Machine Tool Works Limited.—Net profit after all administration expenses, depreciation, and directors' fees, £16,411 (£13,299), less provision for taxation, £8,500. The directors have placed to development reserve £1,493, to contingency reserve £1,500. Carry forward £8,241, against £2,993 brought in.

Contracts and Tenders

Class 1 railways in the United States had, on April 1, 1941, 42,335 freight wagons on order, according to the Association of American Railroads, an increase of 21,223 on the number on order on April, 1940, and an increase of 2,982 on the number on order on March 1 this year. New freight wagons for which orders had been placed on April 1, 1941, consisted of 24,627 box, 15,141 coal, 1,244 refrigerator, 1,167 flat, and 156 miscellaneous wagons.

Class 1 railways on April 1 of this year also had 335 new locomotives on order, of which 166 were steam and 169 electric and diesel. On April 1, 1940, there were 115 new locomotives on order, 59 of which were steam and 56 electric and diesel. Locomotives on order on March 1, 1941, totalled 298, of which 132 were steam and 166 electric and diesel. New freight wagons put in service in the first three months of 1941, totalled 18,464, compared with 20,253 for the same period last year.

The United States railways and their equipment manufacturers are producing rolling stock at the fastest rate for twenty years to meet the demands of present and future traffic. Estimates show that about 100,000 freight wagons are on order or will be ordered this year and that approximately this number will be installed in service by the end of the year, and the Association of American Railroads estimates that another 120,000 wagons will have to be bought to meet 1942 traffic and still another 150,000 to meet the needs of 1943. The Chicago, Burlington & Quincy Railroad and its subsidiaries have ordered 3,325 wagons; the Southern, 3,100; the Atlantic Coast Line, about 2,700; and the Baltimore & Ohio, 2,400. The Pennsylvania Railroad is building 4,750 wagons at its shops.

It is possible that orders for 10,000 more wagons may be booked and delivered before railway traffic reaches its maximum in October. This would mean that the systems would have nearly 90,000 new wagons to meet demand at that time. The 43,539 wagons ordered since the beginning of the year compared with about 66,000 for the whole of 1940, and represent the highest figure for the period since 1929, when traffic reached the greatest volume of all time. There were 53,000 cars ordered in the first four months of 1929.

SOUTHERN RAILWAY AND DEEPDENE HOTEL.—An appeal by the Southern Railway Company against the refusal of the Dorking licensing justices to renew the licence of Deepdene Hotel, Dorking, was allowed with costs at the Surrey Quarter Sessions, Kingston, on May 22. Mr. G. D. Roberts, K.C., for the company said that the company was practically compelled to buy the hotel for administrative purposes. It wished to keep the licence alive until normal conditions return, when it could do what it thought fit with the premises.

Railway Stock Market

Owing to the absence of improvement in the volume of business, very quiet, and slightly reactionary, conditions ruled in the stock and share markets at the beginning of the week. Subsequently, market sentiment was assisted by the war news and President Roosevelt's speech. Security values were inclined to improve, under the lead of British Funds, demand for which is expected to increase, partly owing to the forthcoming re-investment of proceeds arising from the latest requisitioning of American dollar securities. In view of their attractive yields, it is assumed that home railway prior charges will participate in any general upward movement in fixed interest-bearing securities, but meanwhile, owing to the inactivity of markets, they have been less in demand this week, and where changed, most prices were slightly lower on balance. It is not, of course, expected that developments in connection with the co-ordination of transport during the war, nor the expected revision of the financial agreement with the Government, will in any way lessen the high investment standing of home railway prior charges. There is no reason why they should be at levels which show yields in excess of those obtainable on other stocks of a similar status. Moreover, various stocks of the L.N.E.R. and L.M.S.R. are regarded as undervalued in relation to those of the Great Western and Southern. Incidentally, there is no apparent justification for the quotation of Southern 5 per cent. preference at fully six points below Great Western 5 per cent. preference. Furthermore, the yields on L.N.E.R. guaranteed issues are in excess of those on the two above-mentioned preference stocks, which are non-cumulative as to dividend. Assuming, as is anticipated in most quarters, the minimum revenue guarantee is maintained during the war period, it would seem that L.N.E.R. first preference is very moderately priced in comparison with L.M.S.R. senior preference.

Among debentures, L.M.S.R. 4 per cents. are undervalued, compared with the equivalent stocks of the Great Western and Southern. As to stocks of the junior class, the prevailing belief is that during the war they are likely to continue to receive dividends at rates at least equal to those permitted by the minimum revenue guarantee, and on this basis, yields at current prices are substantial. On the other hand, there may be no general revival of activity in the junior securities until there is a statement as to the basis on which the Government's transport co-ordination plans are to be effected, and also a decision as to revision of the financial agreement to provide for the factors of rising costs and wages, and insurance for war damage.

Among the moderate movements in quotations shown on balance for the week was a fractional improvement in Great Western debentures, which have been dealt in around 111½. Great Western ordinary declined slightly to 33. Southern issues were maintained, with the exception of fractional losses in the preferred and deferred stocks, which were 50 and 9½ respectively. L.M.S.R. 1923 preference moved back half-a-point to 38½, and a similar decline to 95½ was shown in the guaranteed stock. L.N.E.R. 3 per cent. debentures changed hands at the slightly lower level of 75½, but on the other hand, the second guaranteed was 71, compared with 70½ a week ago; the second preference eased to 12½. Elsewhere, London Transport "C" at 29½ was fractionally below the price current a week ago.

Very little business was reported in foreign railway securities, but quotations were fairly well maintained, although small declines were shown in Central Argentine debentures and 4½ per cent. preference. Nitrate Railways shares were firm on satisfaction with the financial results. An easier tendency developed in Canadian Pacific.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1940-41	Week Ending	Traffic for Week: Total this year	Traffic for Week: Inc. or Dec. compared with 1940	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1940	Prices: Lowest 1940	Prices: May 27, 1941	Yield % (See Note)
South & Central America	Antofagasta (Chili) & Bolivia	834	18 5.41	£ 17,260	— £ 5,050	20	£ 346,310	£ 380,470	— £ 34,160	Ord. Stk.	11½	3½	4½	Nil
	Argentine North Eastern	753	17.5.41	ps. 67,600*	— ps.123,600	46	ps. 6,488,600	ps. 7,037,200	— ps.548,600	,,	3½	1	2	Nil
	Bolivar	174	Apr. 1941	3,912	— 738	18	14,932	16,240	— 1,308	6 p.c. Deb.	6½	5	6½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds	8	5	5	Nil
	Buenos Ayres & Pacific	2,801	17.5.41	ps.1,545,000	+ ps.215,000	46	ps.65,880,000	ps. 64,391,000	+ ps.1,489,000	Ord. Stk.	4½	1	2	Nil
	Buenos Aires Central	190	18 1.41	$70,400	— $20,200	29	$2,477,400	$2,994,900	— $517,500	—	—	—	—	—
	Buenos Ayres Great Southern	5,082	17.5.41	ps.2,304,000	+ ps.409,000	46	ps.102,516,000	ps.108,889,000	— ps.6,373,000	Ord. Stk.	10⅜	3	3½	Nil
	Buenos Ayres Western	1,930	17.5.41	ps. 900,000	+ ps.223,000	46	ps.35,993,000	ps. 36,501,000	— ps. 508,000	,,	8⅜	2	3	Nil
	Central Argentine	3,700	17.5.41	ps. 2,141,150	+ ps.354,950	46	ps.75,031,850	ps. 81,535,450	— ps.6,503,600	,,	8¼	2	2¼	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	4	¼	1	Nil
	Cent. Uruguay of M. Video	972	17.5.41	25,157	+ 417	46	1,055,077	997,601	+ 57,476	Ord. Stk.	3½	¼	1¼	Nil
	Costa Rica	188	Mar. 1941	18,817	— 3,304	39	136,720	158,217	— 21,497	Stk.	23⅛	14	15½	12⅝
	Dorada	70	Apl. 1941	12,500	+ 900	17	49,200	46,100	+ 3,100	1 Mt. Db	99	97½	98	6 1/16
	Entre Rios	808	17.5.41	ps. 166,100*	— ps.81,300	46	ps. 9,674,200	ps.10,946,000	— ps.1,271,800	Ord. Stk.	4	½	1½	Nil
	Great Western of Brazil	1,016	17.5.41	7,100	— 1,200	20	201,200	234,800	— 33,600	Ord. Sh.	4/-	1/-	7/16	Nil
	International of Cl. Amer.	794	Mar. 1941	$487,887	— $103,925	12	$1,444,383	$1,762,134	— $317,751	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	9d.	9d.	½	Nil
	La Guaira & Caracas	22¼	Apr. 1941	5,915	— 125	18	24,910	28,015	— 3,105	—	6	4	—	—
	Leopoldina	1,918	17 5.41	22,900	+ 589	20	467,780	431,672	+ 36,108	Ord. Stk.	2 7/16	¼	3/32	Nil
	Mexican	483	14 5.41	ps. 298,300	+ ps. 19,900	20	ps. 5,898,600	ps. 5,922,600	— ps. 24,000	,,	2/11½	1/8	3/32	Nil
	Midland of Uruguay	319	Mar. 1941	13,106	— 209	39	107,795	94,539	+ 13,256	—	—	—	—	—
	Nitrate	386	15.5.41	4,098	— 788	20	38,284	69,911	— 31,627	Ord. Sh.	2¾	1½	2 7/16	5 1/16
	Paraguay Central	274	17.5.41	$3,281,000	— $17,000	46	$149,512,000	$147,365,000	+ $2,147,000	Pr. Li. Stk.	41	36	30½	19 1/16
	Peruvian Corporation	1,059	Apr. 1941	68,480	— 5,352	43	£40,466	680,483	— 34,017	Pref.	4	1	2	Nil
	Salvador	100	22.2.41	£26,787	— £17,551	34	£490,660	£615,137	— £124,477	—	—	—	—	—
	San Paulo	153½	18.5.41	40,000	— 1 487	20	721,750	698,570	+ 23,180	Ord. Stk.	50	23	26½	7 7/16
	Taltal	160	Apr. 1941	2,310	— 775	43	27,450	26,220	+ 1,230	Ord. Sh.	15/1½	3/32	3/32	Nil
	United of Havana	1,346	17.5.41	32,015	+ 6,159	46	1,120,110	1,140,645	— 20,535	Ord. Stk.	3/32	1/32	1/32	Nil
	Uruguay Northern	73	Mar. 1941	1,166	— 239	39	10,320	9,995	+ 325	—	—	—	—	—
Canada	Canadian National	23,633	14.5.41	1,213,406	+ 290,607	20	20,233,738	16,044,604	+ 4,189,134	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	— 4 p.c.	Perp. Dbs.	86	68	92	4⅜
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gr.	105⅜	95 1/16	101¼	3 15/16
	Canadian Pacific	17,153	14.5.41	846,800	+ 205,000	20	14,081,800	10,806,000	+ 3,275,800	Ord. Stk.	9 7/16	4⅛	9	Nil
India‡	Assam Bengal	1,329	30.4.41	45,187	+ 6,529	4	135,060	120,437	+ 14,623	Ord. Stk.	99⅜	71	100	3
	Barsi Light	202	31.3.41	5,685	+ 2,318	52	167,280	127,072	+ 40,208	—	—	—	—	—
	Bengal & North Western	2,086	30.4.41	273,900	— 13,992	4	273,900	287,892	— 13,992	Ord. Stk.	283	234	300	5 1/16
	Bengal Dooars & Extension	161	Sept. 1940	14,625	+ 508	46	78,405	66,243	+ 12,162	,,	—	—	—	—
	Bengal-Nagpur	3,269	31.3.41	266,175	+ 11,055	52	8,989,306	8,266,447	+ 722,859	,,	96	83¼	100½	4
	Bombay, Baroda & Cl. India	2,986	10.5.41	297,000	— 27,750	6	1,273,200	1,220,100	+ 53,100	,,	108	99	108½	5⅛
	Madras & Southern Mahratta	2,939	20.3.41	197,475	+ 2,571	51	6,002,820	5,711,952	+ 290,868	,,	104	97⅛	104½	7 1/16
	Rohilkund & Kumaon	571	30.4.41	62,775	— 6,683	4	62,775	69,458	+ 6,683	,,	284	238	293	5 1/16
	South Indian	2,500	31.3.41	143,875	+ 5,550	52	4,605,988	4,134,430	+ 471,558	,,	93¾	83	97½	4⅛
Various	Beira	204	Mar. 1941	73,158	—	26	429,691	—	—	—	—	—	—	—
	Egyptian Delta	610	31.3.41	7,264	+ 1,883	52	245,951	214,172	+ 31,779	Prf. Sh.	7/10½	3/32	3/32	Nil
	Kenya & Uganda	1,625	—	—	—	—	—	—	—	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	53	44½	45½	7½
	Midland of W. Australia	277	Feb. 1941	13,851	+ 1,637	35	119,604	102,871	+ 16,733	Inc. Deb.	88	80	87½	6⅛
	Nigerian	1,900	22.2.41	74,093	+ 16,001	30	2,056,584	1,856,487	+ 200,097	—	—	—	—	—
	Rhodesia	2,442	Mar. 1941	465,823	—	26	2,853,899	—	—	—	—	—	—	—
	South Africa	13,287	12.4.41	689,577	+ 33,190	2	1,265,907	1,187,663	+ 78,244	—	—	—	—	—
	Victoria	4,774	Dec. 1940	1,009,886	+ 65,971	26	—	—	—	—	—	—	—	—

Note. Yields are based on the approximate current prices and are within a fraction of 1/16. Argentine traffics are given in pesos
* Traffic affected by floods. ‡ Receipts are calculated @ 1s. 6d. to the rupee